The Business Magazine for Makers & Users of Chemicals

Management, Research, Production, Marketing

CHEMICAL INDUSTRIES

Contents

Volume 46 Number 6

JUNE, 1940

★

Published monthly, except twice in October, and entered as 2nd class matter Dec. 22, 1934, at the Post Office at New Haven, Conn., under the Act of March 3, 1879. Subscription, Domestic and Canada, $3 a year; foreign, $4. Single copies, 35 cents. 522 Fifth Avenue, New York, N. Y., Murray Hill 2-7888; Chicago: 919 North Michigan Avenue, Whitehall 5842 — Ned Bailey. London: 2 Cockspur Street, S. W. 1, Whitehall 6642 — Donald Hunter.

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The Reader Writes—

Suggests Phone Numbers

There is only one thing wrong with CHEMICAL INDUSTRIES as far as I can see. Phone numbers of your New York, Chicago and London offices would be welcomed by advertisers and others seeking to get in touch with their local branch contacts. I am sure your editor would gladly add these three agate lines to your magazine "masthead" if someone asked him to do so.

I find CHEMICAL INDUSTRIES handy for keeping up with the developments in the "chem-world."

ULMER TURNER, *Newscaster*,
Chicago *Herald Examiner*,
Chicago, Ill.

Editorial Note: Telephone numbers have been added on the Contents Page as Reader Turner suggests.

Best Ever On Research

If available, I would appreciate very much a reprint or two of the address by Mr. William B. Bell, President of American Cyanamid Company.

This is one of the best things I have ever read on the subject of research.

G. V. CAESAR,
Laboratory Director,
Stein, Hall & Company.
New York, N. Y.

Value of the Patent Digest

I want to compliment you on the patent list that you issue each month. I find this most convenient and use it to check through the new patents rather than following *Chemical Abstracts* or the *Patent Digest*.

GEORGE BARSKY,
Barsky and Straus, Inc.,
New York, N. Y.

Dislikes "Backslapping"

Too many "personal notes." The old d . . . backslapping—lately pages of it in each number.

J. A. BACHMANN,
Alameda, Calif.

Editorial Note: The most interesting subject to all people is PEOPLE. We are delighted to note, however, that other features in "C. I." are of sufficient interest to Reader Bachmann to warrant his renewing his subscription for three years.

One of the Best Published

CHEMICAL INDUSTRIES is valuable and interesting to me from cover to cover not only because it represents the industry in which I make my living, but because I believe it is one of the best trade magazines published.

P. J. ROCKLIN, *President*,
Ace Chemical Company,
Cincinnati, Ohio.

Wants Patentee's Name

I suggest you include the patentee's name with their patents. The assignee's name is interesting also but far from sufficient. Don't obliterate the inventor's name for the organization with which he works.

A. C. ZACHLIN,
Cleveland Heights, Ohio.

Editorial Note: Practice of omitting patentee's name was discarded after but one month's trial. Many readers, like Reader Zachlin, objected to having the patentee's name left out.

Date of Prices

If I may make one suggestion concerning your very valuable magazine, it would be that your "Prices Current," which you normally quote, would be very much improved in value by a designation of the actual date of the prices indicated.

LOREN B. GRIMSLEY,
Technical Division,
The Simoniz Co.
Chicago, Ill.

Editorial Note: Unless otherwise designated, the prices shown in "Prices Current" are those in effect on the last day of the month. For example, prices shown in this issue are those in effect on May 31.

Finds "C. I." of Value

Your magazine is doing an excellent job in this field and I want you to know how much we value it.

ALLEN ARRAMS,
Technical Director,
Marathon Paper Mills Company.
Rothschild, Wis.

Last Call

May we ask that our name be included in your new Buyer's Guide when it is published?

All necessary information will be furnished to you upon request.

HENRY A. MALLEY,
Deady Chemical Company,
Kansas City, Mo.

Editorial Note: Questionnaires are now in the process of being mailed. Companies who were not listed in last year's edition and who desire to be should communicate with the Guidebook Department at once.

CALENDAR OF EVENTS

June

June 17-19, First Meeting of the Institute of Food Technologists, Morrison Hotel, Chicago, Ill.
June 17-21, The American Society of Mechanical Engineers, Semi-Annual Meeting, Milwaukee, Wisc.
June 17, 18, and 19, 26th Mid-Year Meeting, National Association of Insecticide and Disinfectant Manufacturers, Spink-Wawasee, Lake Wawasee, Ind.
June 18, Salesmen's Association of the American Chemical Industry, Golf Tournament, Green Meadow Club, Harrison, N. Y.
June 24, The Sulphonated Oil Manufacturers Association, Spring Outing, Seaview Golf Club, Absecon, N. J.
June 24, 25, 26, Flavoring Extract Manufacturers' Association of the U. S., Drake Hotel, Chicago, Ill.
June 24-28, American Society for Testing Materials, Forty-Third Annual Meeting, Chalfonte-Haddon Hall, Atlantic City, N. J.
June 27, Chicago Drug & Chemical Ass'n. Monthly Luncheon, Morrison Hotel, Chicago, Ill.

July

July 1, Chicago Paint & Varnish Production Club, Electric Club, Civic Opera Building, Chicago, Ill.
July 3-5, Canadian Gas Association & Pacific Coast Gas Association, Jasper Park Lodge, Alberta, Canada.
July 4, Indianapolis Paint, Varnish & Lacquer Ass'n., Columbia Club, Indianapolis, Ind.
July 10, New Orleans Paint, Varnish & Lacquer Ass'n., New Orleans Athletic Club, New Orleans, La.
July 16, Salesmen's Association of the American Chemical Industry, Golf Tournament, Canoe Brook Country Club, Summit, N. J.

August

Aug. 1, Indianapolis Paint, Varnish & Lacquer Ass'n., Columbia Club, Indianapolis, Ind.
Aug. 5, Chicago Paint & Varnish Production Club, Electric Club, Civic Opera Building, Chicago, Ill.
Aug. 14, New Orleans Paint, Varnish & Lacquer Ass'n., New Orleans Athletic Club, New Orleans, La.
Aug. 20, Salesmen's Association of the American Chemical Industry, Golf Tournament, Bonnie Briar Club, Larchmont, N. Y.
Aug. 29, Chicago Drug & Chemical Association, Monthly Luncheon, Morrison Hotel, Chicago, Ill.

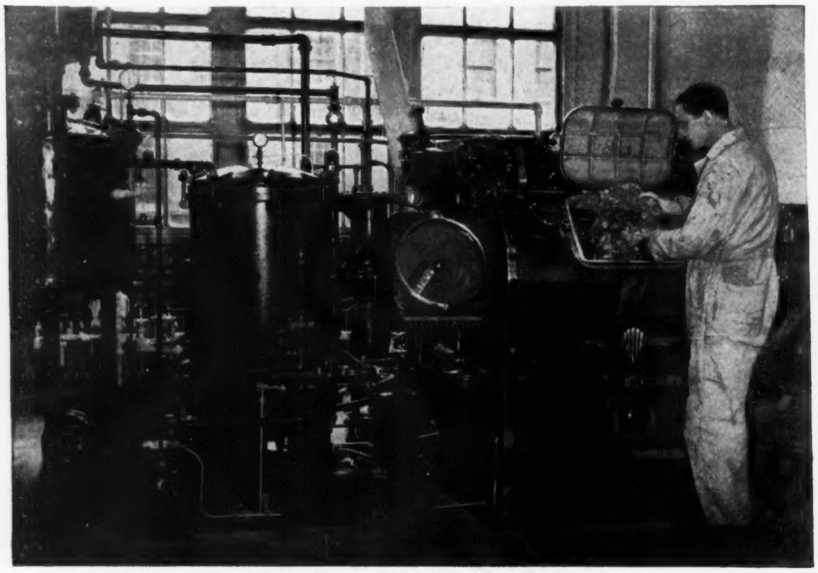
September

Sept. 2, Chicago Paint & Varnish Production Club, Electric Club, Civic Opera Building, Chicago, Ill.
Sept. 3-5, American Society of Mechanical Engineers, Fall Meeting, Spokane, Wash.
Sept. 4-6, Pennsylvania Electric Association, Bedford Springs Hotel, Bedford Springs, Va.
Sept. 5, Indianapolis Paint, Varnish & Lacquer Ass'n., Columbia Building, Indianapolis, Ind.
Sept. 6, Baltimore Paint & Varnish Production Club, Baltimore, Md.
Sept. 8-11, Federal Wholesale Druggists Ass'n., Hot Springs, Va.
Sept. 9-12, American Chemical Society, 100th Fall Meeting, Detroit, Mich.
Sept. 9-12, Illuminating Engineering Society, Essex and Sussex Hotel, Spring Lake, N. J.
Sept. 10, Louisville Paint, Varnish & Lacquer Ass'n., Louisville, Ky.
Sept. 11, New Orleans Paint, Varnish & Lacquer Ass'n., New Orleans Athletic Club, New Orleans, La.
Sept. 17, Salesmen's Association of the American Chemical Industry, Golf Tournament, Pomonok Country Club, Flushing, N. Y.

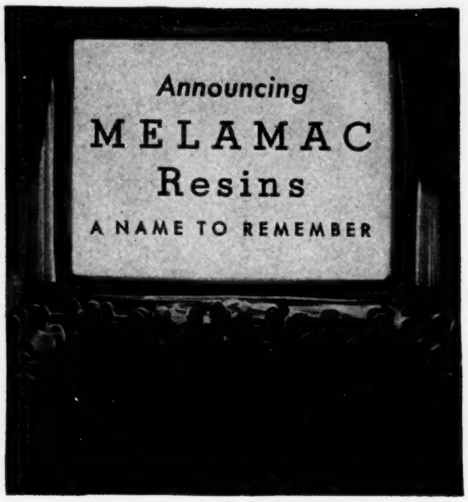
BICHROMATE OF SODA
BICHROMATE OF POTASH
Mutual
MUTUAL CHEMICAL CO. OF AMERICA
MUTUAL
NEW YORK, N.Y.
Bichromates
Mutual Chemical Co. of America
270 MADISON AVENUE, NEW YORK

Life ON THE CHEMICAL NEWSFRONT

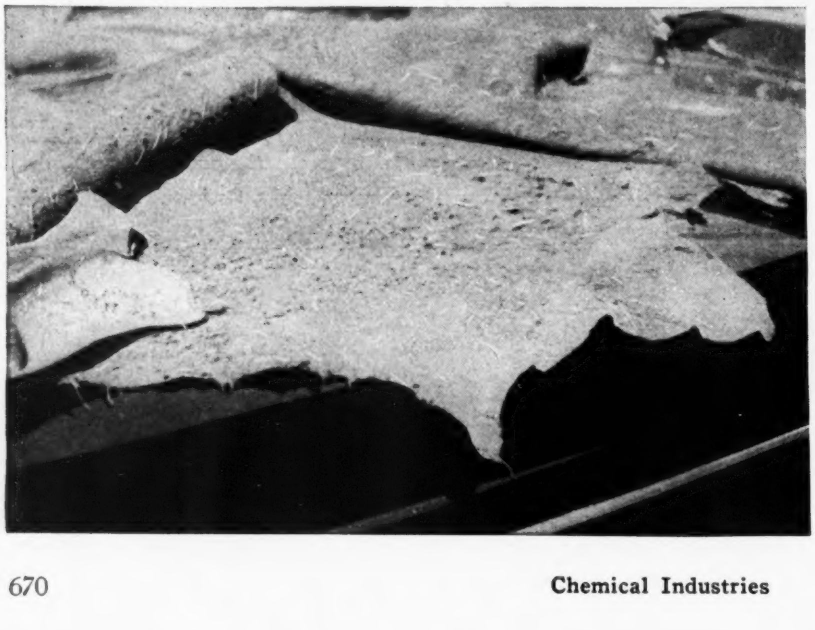
(*Above*) **BEETLE** PLASTIC LIGHTING REFLECTORS** undergo tests for light diffusion on a distribution photometer at Electrical Testing Laboratories. By varying the shape or thickness of the design of a BEETLE reflector, light distribution is controlled upward or downward in proportions necessary for greatest lighting efficiency.



(*Left*) **WOOL IMPORT DUTIES** are computed with new speed and accuracy by aid of this "wool testing machine" developed by H. J. Wollner, consulting Treasury Department chemist. The machine extracts, washes, scours and dries samples of wool shipped in grease; permits "clean content" of a bale to be determined in 20 minutes—an operation formerly requiring two hours.

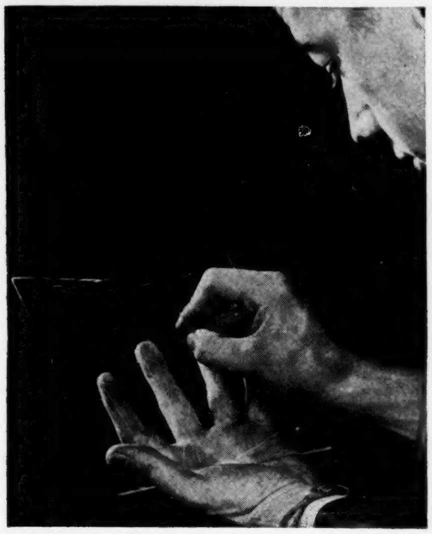


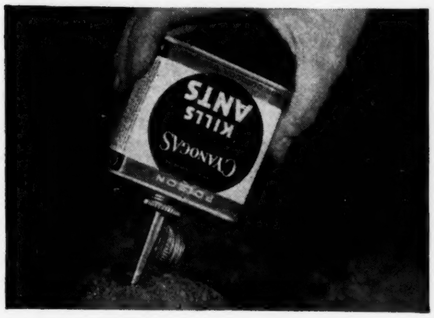
(*Above*) **MELAMAC‡** is the new name of the synthetic resins made by Cyanamid from melamine—until recently a chemical rarity. For surface coatings these new resins offer film hardness, high temperature retention of gloss and color, baking speed at low temperatures, chemical resistance and outdoor durability.



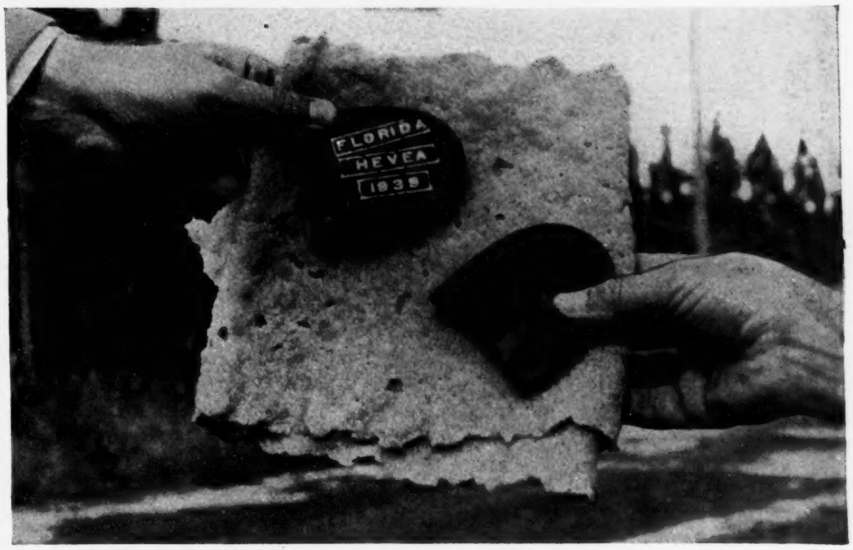
(*Left*) **LEATHER ODDITY** is this sheepskin found with the wool (hair) growing on the flesh side as well as on the grain side of the hide. It brings to mind DEPILIN† Unhairing Compound—one of Cyanamid's line of leather chemicals which includes wetting agents, synthetic tanning materials, leather oils, bating agents.

(*Below*) **APPROACHING DIAMOND HARDNESS** are *high* carbon steels, hardened without quenching by a new process employing a gas "blanket" of hydrogen and nitrogen. For *low* carbon steels, Cyanamid's AEROCASE† and AEROCARB* case-hardening and carburizing compounds are preferred for their ease, speed, economy, and degree of control permitted by the "balanced" bath.

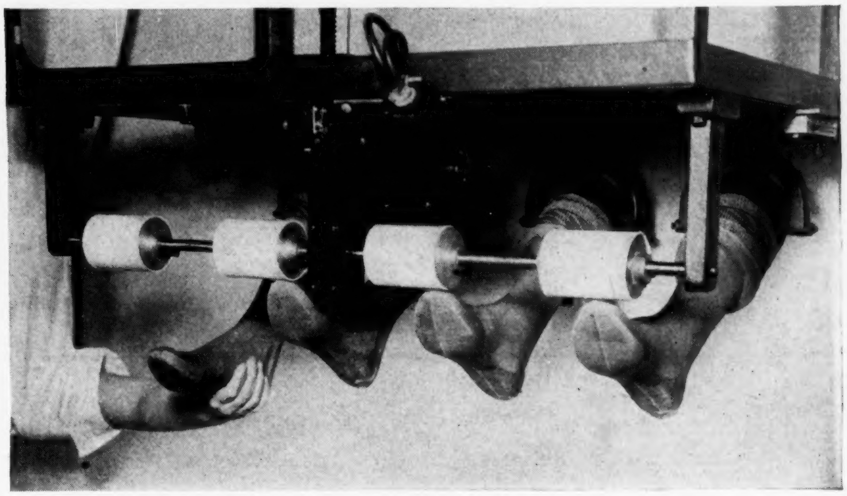




(*Above*) **IF YOU'RE A GARDEN ENTHUSIAST** you undoubtedly know CYANOGAS†, the effective, economical ant killer that has more than fifty other uses in insect and pest control. CYANOGAS is but one of Cyanamid's products in the insecticide, fumigant and fungicide fields. Other leading products for use in horticulture, agriculture, the food, tobacco, milling and other industries include CYANOGAS G-Fumigant, CYANOGAS A-Dust, Liquid HCN, ZYKLON† Discoids. If you have a problem of pest control, consult Cyanamid.



(*Above*) **FROM U. S. TEST-TUBE RUBBER PLANTATION** are the rubber heels and crepe shown here. Made from latex of Hevea rubber trees grown at the Federal Plant Introduction Garden in Miami, Florida, they are said to compare favorably with the East Indian product. Investigation of the possibilities of rubber tree cultivation in the United States has been carried on by the Department of Agriculture for seventeen years. At Miami, the 2000 Hevea trees were brought from Mexico, Puerto Rico and the East Indies. Ultimate plans call for distribution of cold resistant strains to the highlands of Central America and the West Indies.

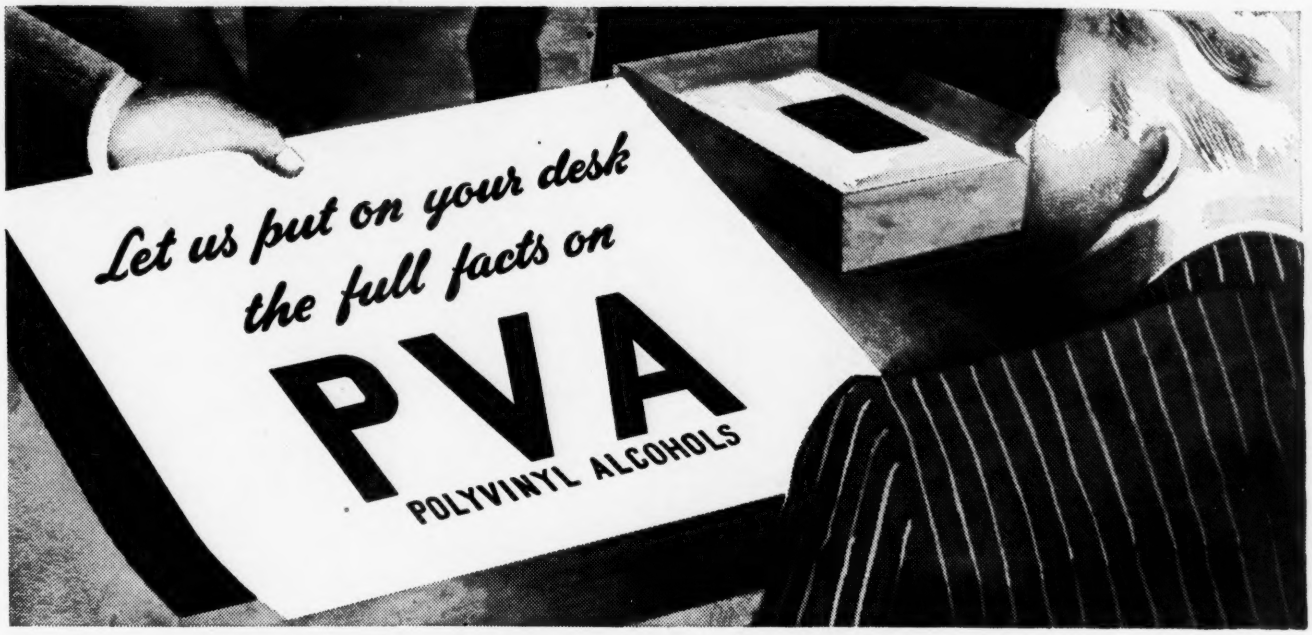


(*Above*) **NEW STYLES IN COTTON HOSE** are tested at the Bureau of Home Economics, U. S. D. A., to determine wearing qualities. Designs from plain knits to ultra-smart full fashioned hose with mesh heel and toe and other style features were prepared by the Bureau to promote interest in hose made from yarns of American-grown long staple cotton. For cotton textiles and to all other branches of the textile industry, Cyanamid supplies a long line of quality chemicals and specialties.

American Cyanamid & Chemical Corporation

30 ROCKEFELLER PLAZA · NEW YORK, N. Y.

*Registered trademark of American Cyanamid Company. ‡Trademark of American Cyanamid Company. Patent Pending.
**Trademark of American Cyanamid & Chemical Corporation applied to case hardening compounds of its own manufacture.
†Registered U. S. Patent Office. °Trademark of American Cyanamid & Chemical Corporation.



Du Pont's New Water Soluble Resin...
AND SOME OF ITS PRACTICAL INDUSTRIAL APPLICATIONS

Opaque • Transparent • Grease-proof Paper Coatings—PVA alone or blended with other materials produces effective grease-proof coatings for paper and paper products. It can be used as a softener and transparentizer; in base coats for lacquered or varnished papers; to increase wet strength of papers and eliminate "linting"; as the adhesive in pigmented coatings.

Oil- and Grease-Resistant Films — Films deposited from aqueous solutions and without use of flammable or toxic solvents are colorless, odorless, tasteless, transparent, exceedingly tough, unaffected by all oils, greases, fats, hydrocarbons, and most of the common organic solvents, e.g., alcohols, esters, ethers, halogenated hydrocarbons, carbon disulfide, etc. The films possess a high degree of impermeability to gases such as hydrogen, hydrogen sulfide, carbon disulfide, etc. They can be made water-resistant.

Adhesives—PVA is a powerful adhesive and can be used in aqueous solution either by itself or blended with other adhesive materials such as rubber latex, starch, casein, soya bean protein, etc. It contributes toughness and flexibility to adhesive preparations and since it is odorless, colorless, tasteless, free from attack by bacteria, should find considerable application where these properties are required or desirable.

Leather Finishes • Paints — PVA solutions are effective media for the dispersing of pigments and are powerful adhesives for binding particles of pigments and other solids to each other and to base materials such as paper, cloth, and leather. These properties indicate the use of PVA in paints, sizes, water colors, printing pastes, leather finishes, etc.

Pigmented Shoe Dressings and Inks—PVA can be used as a binder in white or colored shoe dressings for both smooth and suede leathers. The high film-forming power of PVA largely eliminates chalking or rub-off of the pigment. Its neutral character contributes to stability of pigmented inks and writing inks.

Protective Coatings — Electroplated surfaces, stainless steel, aluminum and other highly-finished metal articles can be protected from tarnish, atmosphere and handling by a thin PVA film which is applied directly from aqueous solution. The temporary protective coating is easily removed by washing in water. It is possible, however, to produce on a given base material a PVA coating or film which is highly resistant to water.

Emulsifying Agent—PVA is a versatile and powerful emulsifying agent for use where ordinarily it is difficult to prepare satisfactory emulsions.

Properties, uses and applications and other data are given in a new bulletin on PVA. Send for your copy today.

E. I. DU PONT DE NEMOURS & COMPANY (INC.)
The R. & H. Chemicals Department
WILMINGTON, DELAWARE

RETURN THIS COUPON FOR YOUR COPY

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REG. U. S. PAT. OFF.

E. I. DU PONT DE NEMOURS & CO. (INC.)
The R. & H. Chemicals Department
WILMINGTON, DELAWARE
Please send me a copy of the DuPont PVA Technical Bulletin

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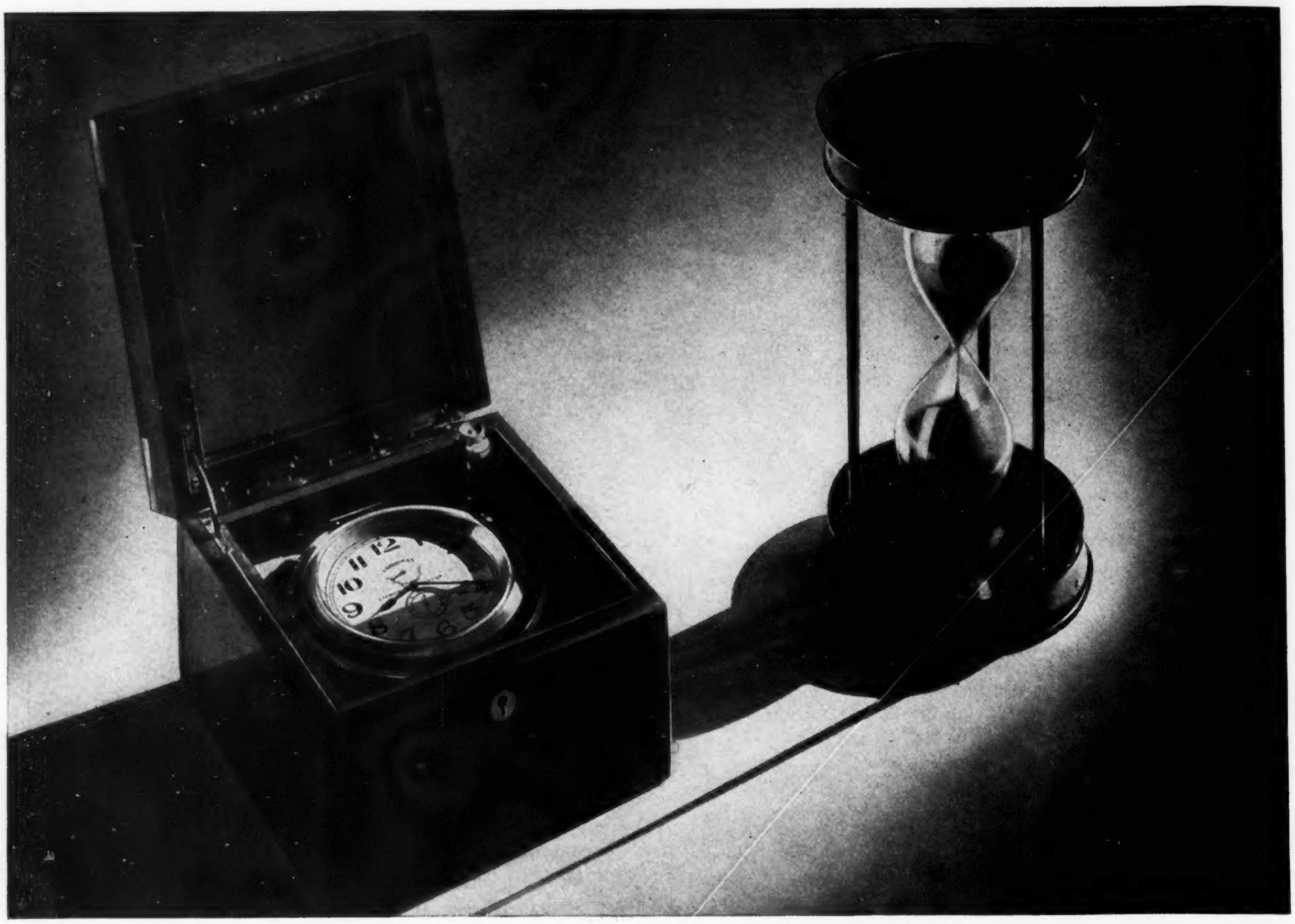


A GUARD ON DUTY
—*always*

That's what you have when your drums are equipped with Tri-Sure Closures

THERE is a sentinel on duty always—a guard that defies all trespass—when a drum is equipped with Tri-Sure Closures.

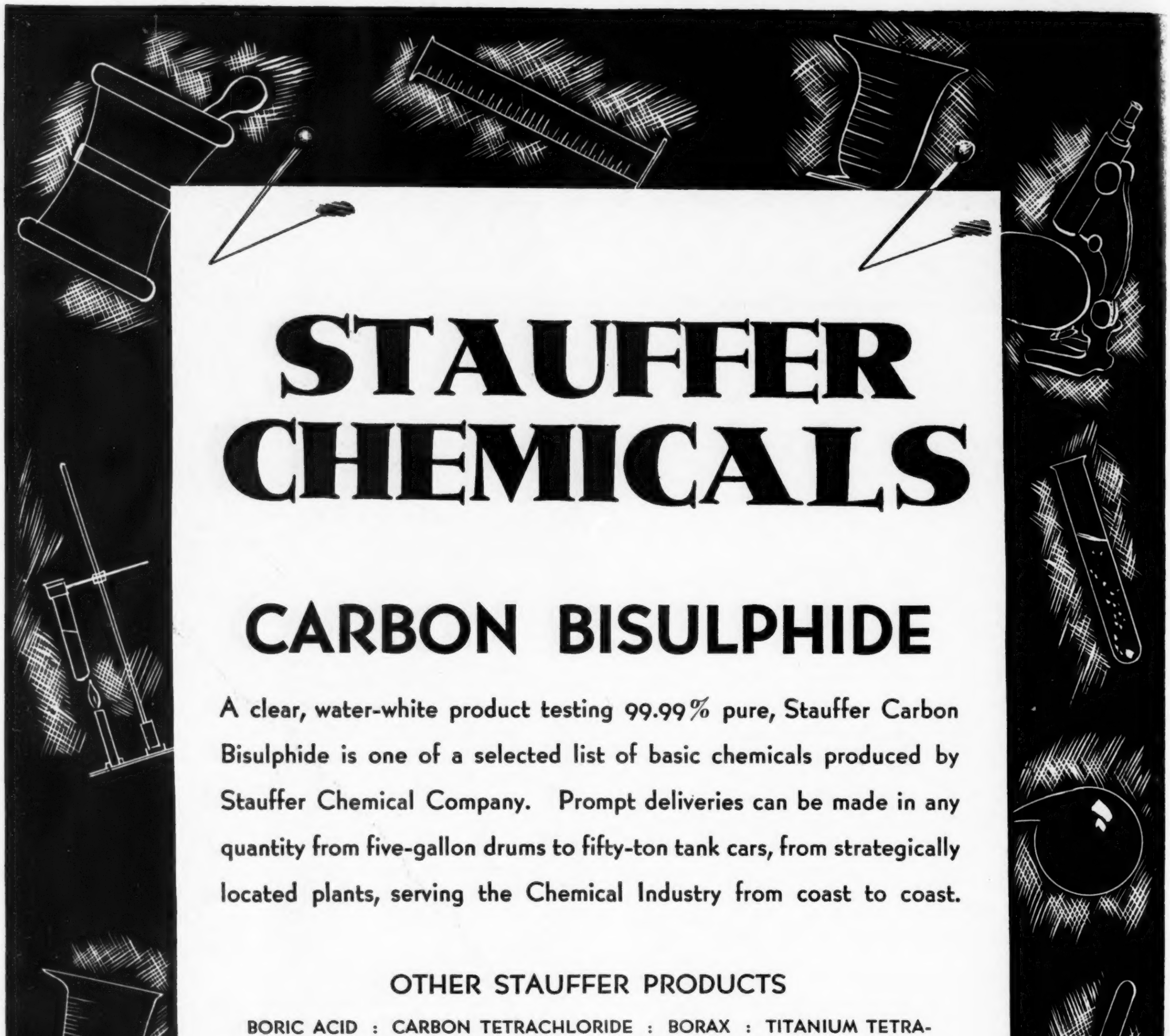
No hand can touch the contents of a Tri-Sure-sealed drum. No leakage or waste can cause the loss of a single drop. The reason is that Tri-Sure Closures give the *triple-protection* of a perfected seal, plug and flange—a leak-proof *seal* which cannot be removed unless it is deliberately destroyed; a perfectly tight *plug* which is held securely by gaskets in plug and seal; a *flange* that is always flush with the inside of the drum-head.

Tri-Sure's triple protection is the kind of protection every drum should have. Why not put this "sentinel" on guard over *your* product and *your* reputation—a sentinel that will say "all's well" with every drop you ship. Write today for information on Tri-Sure Closures.

AMERICAN FLANGE & MANUFACTURING CO. INC.
30 Rockefeller Plaza, New York

Tri-Sure
Reg. U. S. Pat. Off.
CLOSURES

STOP LEAKAGE · WASTE · TAMPERING · PILFERAGE · SUBSTITUTION


STAUFFER CHEMICALS
CARBON BISULPHIDE
A clear, water-white product testing 99.99% pure, Stauffer Carbon Bisulphide is one of a selected list of basic chemicals produced by Stauffer Chemical Company. Prompt deliveries can be made in any quantity from five-gallon drums to fifty-ton tank cars, from strategically located plants, serving the Chemical Industry from coast to coast.
OTHER STAUFFER PRODUCTS
BORIC ACID : CARBON TETRACHLORIDE : BORAX : TITANIUM TETRACHLORIDE : SULPHUR CHLORIDE : SILICON TETRACHLORIDE : CREAM OF TARTAR : SULPHURIC ACID : TARTARIC ACID : WHITING
LIQUID CHLORINE : CAUSTIC SODA : TEXTILE STRIPPER : SULPHUR
Stauffer Chemicals
Stauffer Chemical Co.
420 LEXINGTON AVE., NEW YORK, N. Y.
230 NO. MICH. AVE., CHICAGO, ILL.
624 CALIFORNIA ST., SAN FRANCISCO, CAL.
555 SO. FLOWER ST., LOS ANGELES, CAL.
424 OHIO BUILDING, AKRON, OHIO
FREEPORT, TEXAS APOPKA, FLORIDA

CHEMICAL
INDUSTRIES
The Chemical Business Magazine
Established 1914

Answering the Threat To Democracy

TWENTY-FIVE years ago the United States undertook the task of "making the world safe for democracy." Tragically, all that we fought for now seems hopelessly lost on the European Continent. Once again a life and death struggle is being waged for every principle we cherish. The Western Hemisphere must at all costs become the sanctuary of freedom and the United States must assume leadership in this holy cause.

In this hour of peril we must act wisely as well as with expediency. Every ounce of energy and resources must be mobilized and utilized by experts. This is no time for political leaders to consider party or factional advantage.

Congress has made available the stupendous sum of $3,300,000,000 for defense and the President is seeking two billion more. By whom and how will this money be spent? There must be an end to boondoggling, waste and political subsidies. The shackles placed on industry must be broken. The best brains of our army and navy must be backed up by industrial leaders of proven ability.

England and France first attempted to fight this war with politicians while Germany was ruthlessly but efficiently utilizing scientists and industrialists. We know only too well what the results so far have been. This is no time either for pussyfooting words or action. No President since Lincoln has had the opportunity to perform such signal service for his country.

Does the President honestly believe that he alone can supply the necessary and vital leadership? Does he honestly believe that the rights of labor and the so-called social legislation of his administration can only be preserved if he is re-elected?

The "fireside" chat was far from reassuring on several counts. Just how many planes, anti-aircraft guns and warships are available and how many are simply "on order"? Battles are not fought and won with requisitions or even blueprints, but by weapons of human destruction.

A Defense Board to meet the present situation should be staffed completely with men of the calibre of Knudsen, Stettinius and Budd, recognized leaders in their fields, and given sufficient authority to accomplish results. Anyone in the Chemical Industry or any of its allied branches can readily realize the weakness resulting from the present Board, composed in part of industrialists and in part of those whose only claim to recognition is their interest in social reforms, however desirable these may be in their proper time and sphere. But this is not the time nor is this the field for social service. There is room only for those whose viewpoint is production and then more production with the utmost economy compatible with the utmost efficiency. We need experts, not theorists or fanatics.

Will the newly created Defense Commission be "cashiered" in the same manner as was the War Industries Board when it ran afoul of the Corcoran-Cohen bloc? Will the President insist that there be no lengthening of the hours of labor, no relaxing of the Wagner Labor Relations Act, the Wage-Hour Act and the Walsh-Healey Government Contracts Act? Frenchmen are dying by hundreds of thousands because the Popular Front insisted on a thirty-hour week when German labor was working fifty and even sixty hours a week. God bless and help America to see the truth before it is too late!

Editorial

Nazi Oil Resources: Two schools of thought have argued endlessly over Germany's oil supply—one believing that she was hopelessly short of vital supplies, the other that she was in a position to wage a relentless mechanized warfare for at least a year and possibly longer. The plain fact of the matter is that what German oil resources and reserves are no one in this country or in the Allied countries seems to be in a position to know for a certainty.

That the current "blitzkrieg" in Belgium and France must be taking a terrific toll of German supplies is quite apparent. A single German armored division contains from 425 to 475 light and medium tanks, more than 3,300 other motor vehicles. For a 100-mile foray such a division might well consume 40,000 to 75,000 gallons of gasoline or Diesel oil. There are probably ten to twelve or more armored German divisions. If eight of these are being used in the Western Front drive their consumption must be close to 500,000 gallons of gasoline a day. Add to this the requirements of the German light divisions—motorized infantry plus tanks, as well as the consumption of the air force, variously estimated at from 240,000 to 480,000 gallons daily—and some idea of the transport problem of fuel alone becomes quite apparent even to the layman. It has been estimated that Germany has "burned up" some 720,000 to 1,560,000 gallons or more of gasoline and Diesel oil daily in its thrust towards England. When one considers conditions of war and the condition of the roads in Flanders and Northern France the idea of Germany laying pipelines into the occupied areas no longer seems fantastic. Germany certainly seems prepared to supply her army with sufficient oil supplies for a period of six to nine months, even if they are consumed at the present terrific rate.

Either the French and British are able to withstand for the summer months the terrific pressure now being exerted or theirs is a losing cause. Conversely, Germany, throwing all her resources into one supreme sacrifice, must succeed or she will go down again as she did in 1919 defeated by the lack of natural resources.

Conserving Man Power: It is unlikely in the event that we are called upon to enter the present conflict or to defend the Western Hemisphere at some later date that we will repeat many of the mistakes and follies that seriously impeded our activities and effective date of operations in the World War. It has been reported and not denied that some 1,500 chemists were returned to this country from France, men who either through a mistaken idea of patriotism or through the laxity or ignorance of the local draft boards, were landed in France as members of combat units and then were recalled to posts in industry in this country.

At least one lesson must have been driven home to us from events in Europe and that is we must not weaken our industrial productive capacity. Not alone must we see that our chemists are not placed in front lines, but we must see that thousands of key foremen, etc., vital to our chemical manufacturing operations, are not taken from their posts.

We have planned well, as we have seen in Major Hooker's article on "Industrial Mobilization," appearing in the last issue of CHEMICAL INDUSTRIES, against the requirements of "M" Day, but these blueprints might well be extended to pre-determined plans worked out to the minutest detail, concerning the actual personnel who are to be charged with the production problems that will certainly arise. Today American chemical industry is at the peak of efficiency, but any withdrawal of chemists and others vitally needed in manufacturing operations will be disastrous.

The Status of Chemicals: One of the progressive Southern chemical distributors has posed several questions for us to answer and includes a list of some 24 strategic products consumed in large quantities in the textile field. First, they ask, are these products imported; second, is there a likelihood of shortage of stock in this country; third, would these items be used in large quantities in the event of a large rearmament program in the manufacturing of war airplanes, guns, ammunition, tanks or any form of military equipment. We ourselves might well add one further question —what will the price trend likely be?

We see no reason to be unduly alarmed over adequate supplies of industrial chemicals. We are well-equipped to take care of all legitimate demands for alkalies, phosphates, chlorine, ammonia, mineral acids, industrial alcohol, acetic acid, Epsom salt, etc. Despite our importation of chrome ore, there is every reason to believe that the bichromate producers have stored raw material in extra large quantities against any emergency; our former dependence on foreign sources of supply of caustic potash and carbonate of potash no longer exists. Should existing sources of glycerine prove inadequate we have a synthetic process to fall back upon. Our plant capacity for fixation of nitrogen is certainly adequate to supplement any shortage of sulfate of ammonia that may arise. Our supplies of fats and oils should be sufficient. It may be necessary to resort to certain substitutions, but these should not prove too serious or difficult.

In short, we honestly believe that there is no necessity for alarm or panic concerning our chemical or even our natural raw material supplies: This does not mean that there is any room for hoarding or speculation. While the consumption of industrial chemicals in the rearmament plan will not be very great, before long, other chemical consuming industries like the textile industry, will be stimulated by government purchasing.

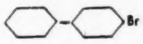
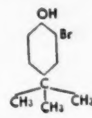
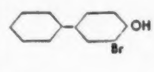
While we do not look for sharp and sudden price increases, in view of the chemical industry's definite stand against any war profiteering, we cannot feel but what higher raw material costs, probably higher labor costs and certainly heavy increases in taxes, will inevitably result in higher prices for most of the important industrial chemicals. Happily, however, we certainly are not in the precarious position of twenty-five years ago. It is strange how it is necessary for a national emergency to arise before many really realize that our chemical industry is certainly one of our front lines of defense.

Dow

6A

DOW SPECIAL PRODUCTS

This is the sixth of a series of advertisements announcing a list of products for which DOW *has developed new processes of manufacture. The Dow Chemical Company invites inquiries from organizations interested in these products.*

Product	BROMOACETIC ACID	4-BROMO-DIPHENYL	4, 4'-DIBROMO-DIPHENYL	4-BROMO-PHENOL	2-BROMO-4-tert-BUTYL-PHENOL	2-BROMO-4-PHENYL-PHENOL
Formula	$CH_2Br \cdot COOH$					
Molecular Weight	139.0	233.1	312.0	173.0	229.1	249.1
Properties	White to pale yellow, deliquescent, crystalline solid with a sharp penetrating odor.	White crystals with a mild aromatic odor.	White crystals with a faint aromatic odor.	White to pink crystals with a phenolic odor.	Clear, pale straw-colored liquid with a mild odor. It forms a crystalline monohydrate with cold water.	Light colored crystalline solid with a faint characteristic odor.
Melting point	38—43° C.	88—90° C.	166—168° C.	64—66° C.	<—20° C.†	93—96° C.
Boiling point	—	311° C.	—	237° C.	109—129° C.***	—
Solubility						
Grams per 100 grams solvent at 25° C.						
Acetone	—	50	3	88	—	Very soluble
Benzene	—	100	8	40	∞	32
Carbon Tetrachloride	26	50	4	3	∞	8
Ether	∞	34	2	Very soluble	∞	Very soluble
Methanol	∞ *	3	0.3	Very soluble	∞ *	125*
Water	∞	Insoluble	Insoluble	1**	—	Insoluble

*Alcohol **at 15° C. ***Boiling range at 5mm. Hg, 5—95% †Freezing Point

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PROGRESS IN INTERMEDIATES

By John Morris Weiss, B.S.

Weiss and Downs, Inc.

Prior to 1914, There Was Little Interest in Domestic Production of Coal Tar Intermediates. Imports Flowed Into the United States in Comfortable Quantities, Adequate For All Domestic Needs. But When the War Disrupted Sea Traffic, Pinched Consumers Sought U. S. Suppliers. How American Intermediate Manufacturers, Starting From Scratch, Attained Their Present Ponderous Production—About 600,000,000 Pounds Yearly—is Told in This Valuable History of the Field.

AT the Philadelphia Centennial World's Fair in 1876, some forty-two years before the end of the world war, an exhibit of coal tar derivatives was made by Page, Kidder & Fletcher in their "Palisade Chemical Works" at Bull's Ferry, N. J. Page, Kidder & Fletcher were one of the original tar distillers of the United States who were later absorbed in the combination—The Barrett Company—now a subsidiary of the Allied Chemical & Dye Corporation. Of the 74 materials shown in the descriptive circular of this exhibit which is reproduced on the following page, about 50 are recognized today as coal tar intermediates, while the balance are coal tar crudes or finished products.

Two views showing operations in intermediate manufacture at Monsanto Chemical's St. Louis plant. The American chemical engineer and American designed and made chemical equipment and the research ability of the American chemist backed by progressive business leaders have made possible an intermediate industry in this country that is the envy of the world.

This exhibit, of course, did not represent actual manufacture in the United States (except as to certain coal tar crudes) and the samples were, in the main, laboratory made or imported. It does, however, show an early interest in coal tar intermediates in this country. It is surprising to note the breadth of range covered by the materials displayed, including derivatives such as phenol, aniline, benzoic acid, naphthylamine, and anthraquinone. No doubt there were hopes at that time of establishing an intermediate industry in this country.

These hopes were not realized prior to the World War of 1914. Up to that time the only intermediates produced in any substantial quantity in the United States were nitro benzol, aniline, nitro toluol, toluidine and nitro naphthalene. These were based on developments of the H. W. Jayne Chemical Co., later the chemical department of The Barrett Company, at Frankford, Pa. About 1910, these few intermediate operations, by that time only nitro benzol and aniline, were transferred to the Benzol Products Company, in which Barrett Company, General Chemical Company and Solvay Process Company were jointly interested. Only a portion of the country's use of these products was made in the United States. The balance, as well as all other intermediates used, was supplied by imports, chiefly from Germany. At the outbreak of the World War, the imported supplies were cut off and the United States, starting from scratch, had to develop adequate domestic sources.

The years 1914 to 1918 showed great progress—the emphasis was on getting production, with costs and to a large extent purity as secondary considerations. Speed was essential and there was no time for the research and development necessary for efficient operation. Considering the difficulties, the lack of technique and of trained personnel, the progress was indeed remarkable, and in 1918 we had 128 establishments manufacturing coal tar intermediates of one sort or another and producing 117 different chemical products in this class. According to the dyestuff census for that year, the production of coal tar intermediates was around 358,000,000 pounds and the average value around $.35 per pound. The general situation was one of rather inefficient factories, poor yields, high costs and, to a large extent, quality inferior to the pre-war imported products.

The following table illustrates vividly the course of the industry from then until now, the figures being

SEVENTY-FOUR BODIES

OF THE

AROMATIC GROUP DERIVATIVE FROM COAL TAR.

PRODUCED BY

PAGE, KIDDER & FLETCHER,

Palisade Chemical Works, Bull's Ferry, N. J.

OFFICE, No. 10 WARREN ST., NEW YORK.

J. C. F. CHEEVER, Superintendent and Chemist.

(Graduate of Lawrence Scientific School, Harvard.)

D. W. WARDWELL, Assistant Chemist.

(Graduate of Sheffield Scientific School, Yale.)

1 L.* Benzene.
2 L. Monochlorobenzene.
3 S* Dichlorobenzene.
4 L. Nitrobenzene.
5 S Dinitrobenzene.
6 L. Amidobenzene (Aniline).
7 S Paranitraniline.
8 L. Cyanobenzene (Phenylcarbamine).
9 S Azobenzene.
10 S Phenol.
11 L. Methyl Phenate (Anisol).
12 S Orthonitrophenol.
13 S Trinitrophenol (Picric Acid).
14 S Dinitroamidophenol (Picramic Acid.)
15 S Barium Isopurpurate.
16 S Tribromophenol
17 S Quinone.
18 S Hydroquinone.
19 S Tetrachloroquinone (Chloranil).
20 S Toluene.
21 L. Nitrotoluene, 1-2.
22 S 1-4.
23 L. Amidotoluene (Pseudo-toluidine), 1-2.
24 S Amidotoluene (Toluidine), 1-4.
25 L. Cresol.
26 L. Benzylchloride.
27 L. Benzaldehyde (Oil of Bitter Almonds).
28 S Benzoic Acid.
29 L. Methyl Benzoate.
30 L. Ethyl Benzoate.
31 S Benzamide.
32 L. Benzonitrile.
33 L. Salicylaldehyde (Oil of Spirea).
34 S Salicylic Acid.
35 L. Methyl Salicylate (Oil of Wintergreen).
36 L. Isoxylene.
37 L. Nitroxylene.
38 L. Xylenol.
39 S Pthalic Acid.
40 L. Styrolene.
41 L. Mesitylene.
42 L. Pseudocumene.
43 L. Cymene.
44 L. Pyridine.
45 L. Picoline.
46 L. Collidine.
47 L. Leucoline.
48 L. Acridine.
49 S Diphenyl.
50 S Stillbene,
51 S Aurine.
52 S Leucaurine.
53 S Rosaniline.
54 S Rosaniline Hydrochlorate.
55 S Leucaniline.
56 S Naphthalene.
57 S Naphthalene dichloride.
58 S Mono nitronaphthalene.
59 S Dinitronaphthalene.
60 S Amidonaphthalene (Naphthylamine).
61 S Naphthol.
62 S Naphthoquinone.
63 S Acenaphthene.
64 S Phenanthrene.
65 S Phenanthrenquinone.
66 S Anthracene.
67 S Paranthracene.
68 S Anthraquinone.
69 S Mono nitroanthraquinone.
70 S Alizarin.
71 S Pyrene.
72 S Pyroquinone.
73 S Chrysene.
74 S Chrysoquinone.

* L Liquid. * S Solid.

List of coal tar derivatives exhibited in 1876.

taken from the Dyestuff Census figures of the Tariff Commission:

Year	Number of Types of Intermediates Produced	Production 1,000,000 lb. units	Average Value Cents per lb.
1918	117	358	34.8
1919	216	177	35.5
1920	236	257	37.0
1921	233	71	25.0
1922	280	165	22.3
1923	311	231	22.6
1924	312	187	24.0
1925	308	211	23.0
1926	319	230	21.8
1927	313	240	21.7
1928	347	279	20.8
1929	362	354	19.4
1930	407	291	18.1
1931	X	267	18.5
1932	X	218	17.8
1933	534	371	14.5
1934	550	408	15.0
1935	X	437	14.0
1936	535	510	14.2
1937	X	576	15.0
1938	X	402	15.0

X Not reported in detail.

By 1938, the number of establishments producing coal tar intermediates had fallen to about 55 or slightly less than half the number of 1918. The number of chemical products produced, however, was almost five times as great in 1938 as in 1918. Over the period, the tonnage of intermediates has varied widely. Exclusive of an excess production of phenol (for war purposes) in 1918, there were about 200 million pounds of intermediates produced. Since then there has been a general rising tendency (with peaks and valleys according to general business conditions) to around 575 million pounds production in 1937. The average value per pound has, with few exceptions, decreased regularly from year to year from 35 cents to 15 cents over the period. Transferred to a gold basis the 1938 price is about 25% of the average price of 1918. True, the years are not strictly comparable because the ratio of various products made is quite different, but the general trend of the figures is true. They represent the building up of a large important industry with a steadily increasing diversity of products and a generally increasing total tonnage. This has been accompanied by a phenomenal reduction in selling price and a marked and steady improvement in purity and quality. Today the coal tar intermediates made here are equal or superior to those produced anywhere in the world.

Vital to Many Important Industries

Coal tar intermediates are vital to the success of many other of our important industries. Their necessity as the basis of dyestuffs and medicinals is known to everyone. In addition, they form the basis of most of our synthetic resins, of rubber accelerators and deoxidants, of many of the accessory materials of the paint and varnish industry, as well as numerous small tonnage but important products, such as the gum inhibitors for gasoline, thickeners for lubricating oil, wetting agents, and a variety of insecticides.

Each of the 500 odd products has a story of its own and affects in some degree several of our important industries and all important changes cannot be covered in the limited space available. A few individual products, selected as examples, will show how specific coal tar intermediates, and the technical improvements made therein, have affected our national economy. Naturally many individual achievements have to be neglected.

Dyestuff and medicinal production represent an important use of coal tar intermediates and we will first consider several materials which are for the most part used in these fields and will present the figures of production and price in the form of curves. The data, on which the curves are based, were taken largely from the Dyestuff Census figures of the United States Tariff Commission which were published yearly except for 1931 and 1932. Gaps in the value of the individual products have been filled in by taking the quoted figures from CHEMICAL INDUSTRIES and placing them on the same base as those reported by the Tariff Commission.

Figures I, II and III show the course of three intermediates—aniline, dimethyl aniline and sulfanilic acid, all derived from the coal tar hydrocarbon benzene, usually referred to as benzol. Aniline production today is about where it was in 1920, while dimethyl aniline has decreased and sulfanilic acid has increased. The variations in production are largely due to the variations

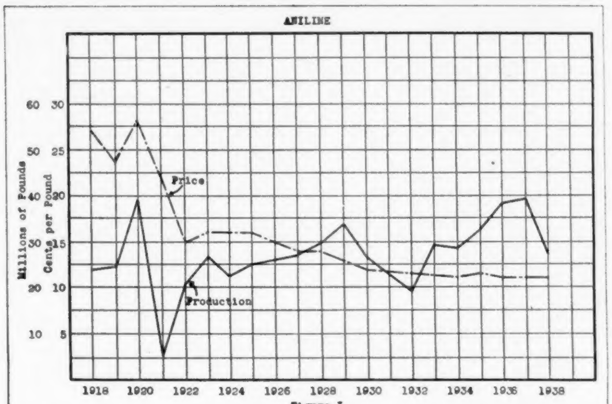


Figure I

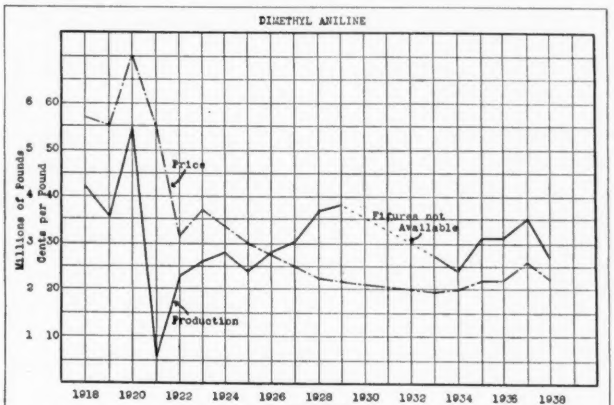


Figure II

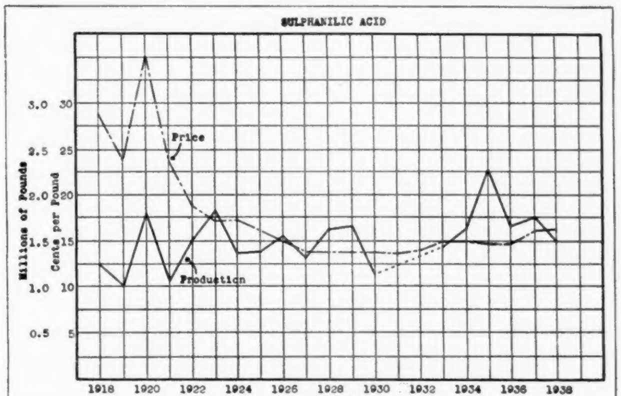


Figure III

in popularity of the dyestuffs produced from each intermediate. The fact is that the tonnage figures of the products are not of great economic significance—all in all, there has been little growth in use of this type of coal tar intermediate. The tonnage of aniline dyes has not changed essentially over the period of study. The rate of growth, if any, is extremely slow and uncertain. In spite of this lack of growth however, price reductions have been substantial. In all cases there has been a very sharp drop between 1918 and 1925 with a levelling but still slowly falling tendency thereafter. This lowering of price reflects better technology and more efficient plants, as well as a concentration of operations into fewer hands. With aniline there are 7 makers today as against 16 in 1918; with dimethyl aniline 3 as against 7; and with sulfanilic acid 6 as against 14, and this reduction in producing plants has made larger unit operations possible.

In addition to improvements in the technique of operating the old processes, in some cases such as with aniline, entirely new processes have developed. In 1918, all the aniline was produced by nitrating benzene and reducing the nitro benzene formed with iron filings. Today, a substantial part of the production is made by the chlorination of benzene and the treatment of the chlor benzol with ammonia. The new process has not supplanted the old one; both are in operation; but the competition between the processes has kept prices at a lower level than would otherwise be the case. It is surprising that the low prices have not stimulated and expanded the use of aniline, and apparently new uses of substantial tonnage, which the lower price would justify, have not been found.

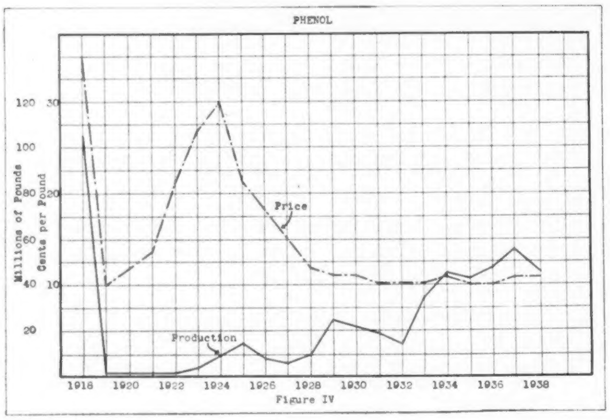
Intermediates from Naphthalene

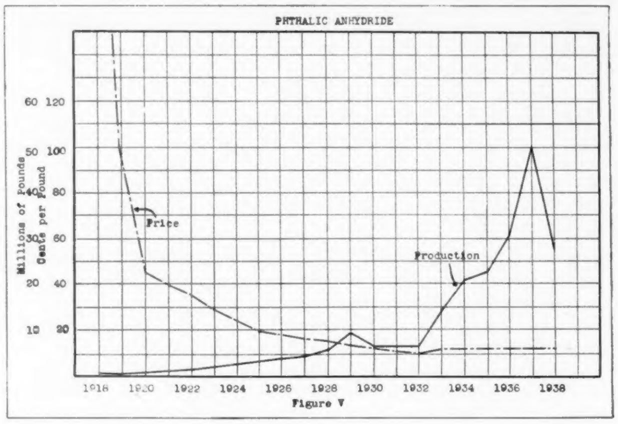
Several coal tar intermediates derived from naphthalene are also for the most part consumed in the dyestuff industry. These show a very similar picture to that of the coal tar intermediates derived from benzene. With beta naphthol, for instance, the production was 5,118,000 pounds in 1918. In 1920 the production reached a peak of nearly 12,000,000 pounds which has only been exceeded in 1936 when about 15,000,000 pounds were produced. The price has fallen from around 60 cents per pound in 1918 to around 22 to 23 cents today. Alpha naphthylamine reached a peak production of around 5,000,000 pounds in 1920, and has never exceeded this figure, the 1936 production reaching only 4,500,000 pounds. The price reduction has been substantial, from around 50 cents per pound in 1918 to around 30 cents today, although considerably less proportionally than with the majority of coal tar intermediates. The production of the well known "H" acid (a sulfonic acid derived from amino naphthol) has varied from year to year within the limits of 2,200,000 pounds to 3,800,000 pounds except for the peak of 1920 and the valley of 1921. Its price, however, has been steadily reduced from about $1.70 in 1918 to around 45 to 50 cents.

With the exception of the intermediates used for the vat dyes, the foregoing is typical of the course of coal tar intermediates solely used in the dyestuff industry. Growth in tonnage, if any, has been slow but not startling. Changes represent largely shifts from one class of dyes to another. Improved technology, i.e., better yields on transforming intermediates into dyes, has tended to restrict the increase of tonnage. Future growth may be expected to be slow—the country's actual requirements for dyes is limited by the population and by fashions—and hence there appears little likelihood of any considerable rapid expansion.

Only when we consider the coal tar intermediates which are used in other than the dyestuff and medicinal industries, do we find the picture of large and increasing tonnage possibilities. One example is phenol.

Until the outbreak of the World War, phenol was produced as a by-product of coal tar refining and the domestic supply, augmented by some imported mate-





rial, sufficed for our medicinal and synthetic resin needs. Under war conditions, large amounts of picric acid (tri nitro phenol) were required and a large synthetic industry sprung into being, and was operating at a high rate of production during 1918. The course of phenol production and prices since then is shown in Figure IV.

In 1918 the World War ended and the production largely went into inventory because of the lack of demand for picric acid. The average price of 35 cents was a sharp drop from the previous year where around $1.00 per pound was the ruling figure. The accumulated inventories (largely in the hands of the United States government) caused a price reduction in 1919 to around 10 cents per pound. This stimulated the use of phenol in resins of the Bakelite type and these showed a substantial growth in use. By 1922 the accumulated inventories were gone, and the increasing demand which required amounts over the material naturally produced from coal tar caused a price rise. Synthetic production was resumed both by the old process involving the initial sulfonation of benzene and by a new process involving the chlorination of benzene.

The price, however, continued to rise and during 1924, the chief user of phenol for synthetic resins installed its own synthetic plant with a rated capacity sufficient for its own needs. As this went into full operation, the price continually dropped and finally reached a point around 1928 where the resin producer decided to shut down the operation and purchase from the other synthetic phenol producers, the plant having achieved its purpose of breaking the market to a reasonable price level. Since then the price has been rather stable, with a slight falling tendency up to the present. Since 1932 the use of phenol, largely in synthetic resins, has shown a very rapid growth. This does not entirely represent the expansion of synthetic phenol, since from other causes, to be discussed later, the production of natural phenol from coal tar has been substantially increased.

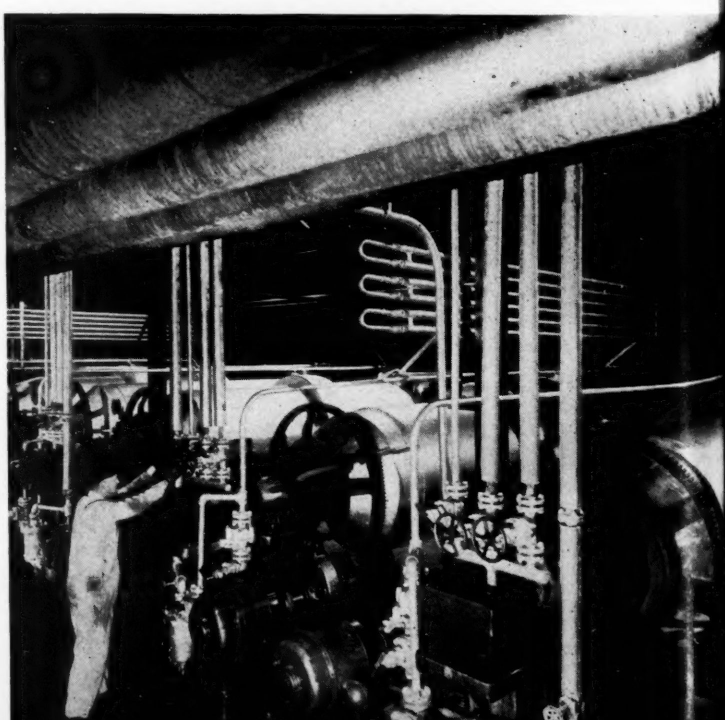
Synthetic phenol, however, sets the price level, so long as natural phenol is insufficient to meet all demands. Natural phenol, as a by-product of other operations, can, if necessary, be sold at a price below the cost of production of synthetic phenol by any known process. The two synthetic processes, one using sulfuric acid and the other chlorine, are very close in cost and with any new plant, the selection of which process to use would be a question of a very careful economic study, in which plant location in relation to other operations would play an outstanding part.

Synthetic phenol manufacture on a large, efficient scale, is a very important matter from the standpoint of national defense. We now have a capacity available well above half our maximum needs during the World War. In time of need this could be quickly expanded to meet any conceivable contingency, instead of starting from nothing as was necessary in 1914.

Another intermediate—phthalic anhydride—shows an even more remarkable growth curve than phenol. Its production and price level are illustrated graphically in Figure V. Prior to the war this product was made by the oxidation of naphthalene with sulfuric acid. The process was not a cheap one. The chief uses of the product were in certain dyestuffs such as eosin and in medicinals such as phenolphthalein. During the war, a new process, involving the catalytic oxidation of naphthalene with air, was discovered and this was being carried out on a small scale during 1918 and 1919.

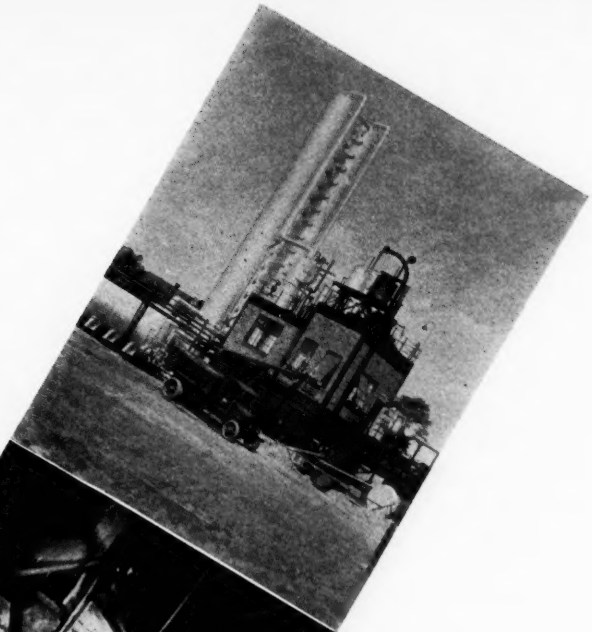
Manufacture by this method gradually increased and the price dropped from $2.85 per pound in 1918 to around 25 cents per pound in 1920. Consumption was stimulated and one of the first effects was in connection with vat dyes. These are in general based on anthra-

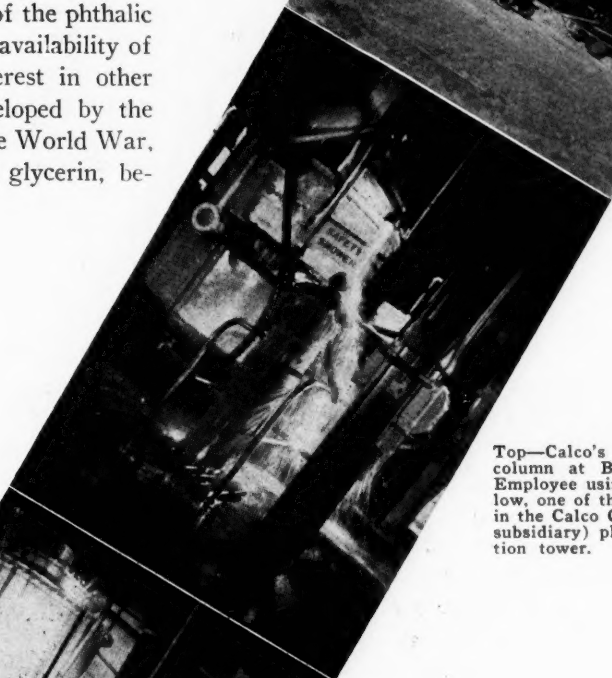
Series of aniline reactors in Dow plant.

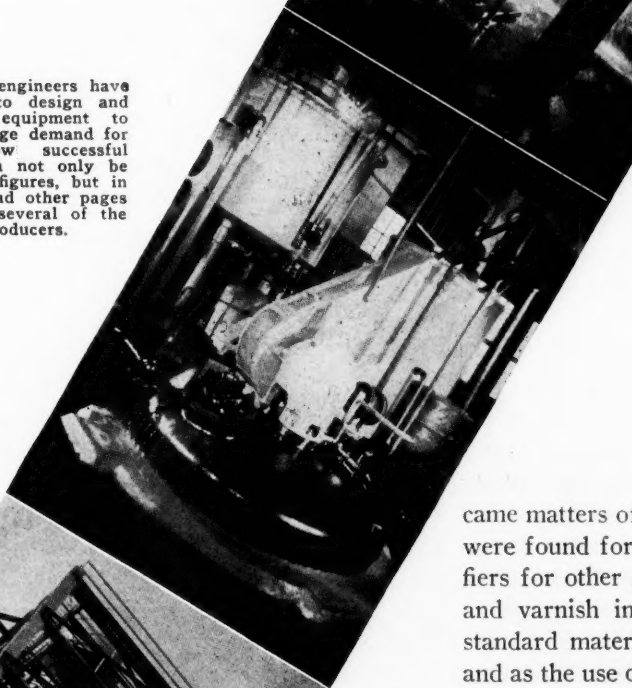


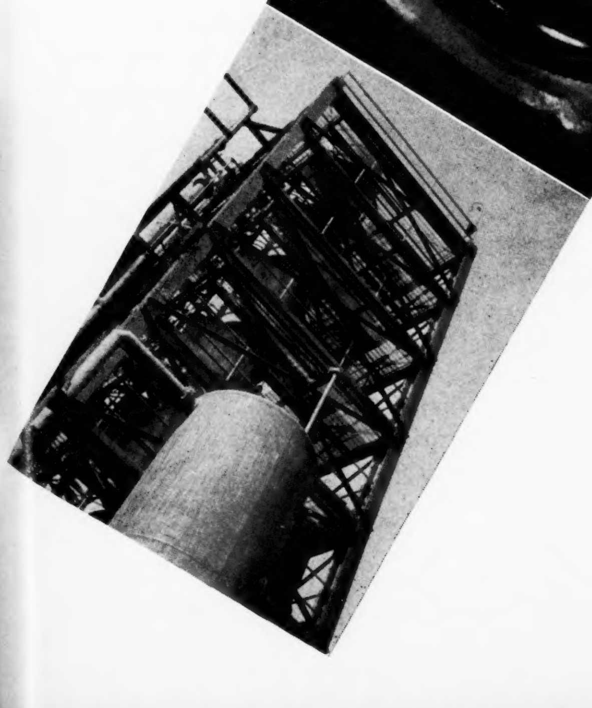
quinone, an intermediate formerly made from anthracene, which was difficult to isolate from coal tar of a grade suitable for anthraquinone manufacture. Costs of anthraquinone were therefore high. With low price phthalic anhydride available, it became possible to use an old well known reaction (the Friedel Crafts synthesis) and produce a very pure anthraquinone from phthalic anhydride and benzene, using aluminum chloride as a catalyst. This anthraquinone synthesis proved cheaper than the process starting with anthracene and, as far as the U. S. is concerned, naphthalene has replaced anthracene as the basis of the vat dye industry.

This resulted in a moderate expansion of the phthalic anhydride market. At the same time the availability of cheap phthalic anhydride stimulated interest in other possible uses. The Glyptal resins, developed by the General Electric Company, long before the World War, and made from phthalic anhydride and glycerin, became matters of renewed interest. More and more uses were found for these resins, either as such, or as modifiers for other natural and synthetic resins. The paint and varnish industry began to adopt these resins as standard materials in varnishes, lacquers and enamels, and as the use of phthalic anhydride expanded, the price continually decreased.









Top—Calco's fractional distillation column at Bound Brook. Left—Employee using safety shower. Below, one of the series of autoclaves in the Calco Chemical (a Cyanamid subsidiary) plant. Bottom, absorption tower.

American chemical engineers have been called upon to design and fabricate unusual equipment to meet the present huge demand for intermediates. How successful they have been can not only be seen in the census figures, but in the views on this and other pages taken in plants of several of the country's leading producers.

By 1929 the United States production approached 10,000,000 pounds per year as compared with less than 500,000 pounds in 1919. The price had dropped to around 12 cents per pound and has since levelled off around that range. From 1932 on, the use of synthetic resins of the Glyptal type increased at an almost unbelievably rapid rate. The use of these resins also involved the use of plasticizers, and esters of phthalic anhydride, especially dibutyl phthalate, proved to be most advantageous. The net result was that the production of phthalic anhydride increased from around

6,000,000 pounds in 1932 to over 30,000,000 pounds in 1936, with indications of a 50,000,000 pound production in 1937. At the end of 1937 the installed capacity for phthalic anhydride was around 70,000,000 pounds.

Naturally, the demand for naphthalene increased in proportion to the growth of phthalic anhydride. We had large potential supplies of naphthalene in our coal tars but only a small part of it had been recovered. In fact, we relied on imported crude naphthalene, which was available at a very low price, for a substantial part of our needs. In 1933 imports of crude naphthalene were around 43,000,000 pounds and domestic production 30,000,000 pounds. In 1936 with prices about doubled, the imports were 40,000,000 pounds, slightly less than in 1933, while the domestic production had more than doubled to approximately 70,000,000 pounds. Still further expansion of domestic naphthalene producing capacity took place in 1937.

The production of naphthalene from coal tar also involves the simultaneous production of tar acids, especially phenol and the cresols. It is estimated that during 1936 the production of phenol from coal tar reached an all time peak of 22,000,000 pounds, or 48% of the total of natural and synthetic phenol production. The increase of natural phenol did not, however, affect the prices, since its total was far less than the total demand —hence, as previously noted, the synthetic production was the controlling price factor.

Along with the natural phenol, in 1936 tar distillers produced about 45,000,000 pounds of various cresols which represented almost double the production of the previous year. There is no synthetic process available to make cresol, so that the natural product sets its own price. Very surprisingly, however, the domestic synthetic resin industry, the principal user of cresols, absorbed all the extra production without a break in price and at the end of 1936, cresol supplies were short. It almost seemed as if there were no limit to the consuming capacity other than the available supply. The rapid, startling growth of the phthalic base resins was plainly not at the expense of the older phenolic resins.

During recent years phthalic anhydride has also entered another new field. Benzoic acid can be produced by the pressure treatment of phthalic anhydride with caustic thus supplanting the older process involving oxidation of toluene. Today, most of the United States production of benzoic acid and sodium benzoate is by the new method. Here we have a product formerly based on toluene, now based on naphthalene. In time of war, when all possible available toluene is required for T.N.T., this is especially advantageous.

Phthalic anhydride may be expected to expand further in use. The recent commercial production of the "Monastral" blues, very stable blue pigments of high quality, rests on phthalic anhydride as a basic raw material. The whole story indicates how cheapening an old chemical product can transform it from a minor chemical to a tonnage product.

We may look to the resin industry as a consumer of other coal tar intermediates. In addition to the "Glyptal" and phenolics, there are a large number of other synthetic resins, either developed or in the course of development, which will consume substantial amounts of chemicals. Some of them are based on aliphatic intermediates, but others will utilize chemical products obtained from coal tar. Already the resin industry is using substantial quantities of maleic acid and maleic anhydride made by the catalytic oxidation of benzene with air. These products have expanded from less than 500,000 pounds per year in 1932 to over 3,000,000 pounds in 1937. The more rapid development of maleic acid and maleic anhydride has been curtailed by the fact that the price has been maintained at a materially higher level than with phthalic anhydride. Maleic acid and anhydride have many potentialities outside of the resin field since they are extremely reactive chemical compounds which makes for a wide field of usefulness. Besides the use in the "Glyptal" type resins, they are now used in "Petrex" resins (from terpenes) as a modifier for natural rosin and as a base for the production of other organic acids, such as malic acid, fumaric acid, succinic acid and aspartic acid. From these acids and other readily prepared derivatives, a vast number of further products can be synthesized—a rich and to a large extent undeveloped field of organic chemistry.

Many of the coal tar intermediates have found new uses in industry and although actually finished products in connection with these uses, they are still considered in the broad intermediate class. A noteworthy example is para dichlor benzene. Originally this was a useless by-product, obtained in making ortho dichlor benzene for dyestuffs. Large quantities were destroyed since no use was available. Investigations showed its value as an insecticide and moth repellent and today its use in this field represents substantial tonnage requirements, so that it is produced, per se, as a main product. Then, too, we have such products as diphenyl which was not produced to meet the demands of the coal tar dye industry, but which as Dowtherm has found extensive application in heating systems for temperatures above those possible with steam. Chlorinated diphenyl (arochlor) is replacing petroleum oils in electrical transformers due to its low flammability and consequently reduced fire hazards. Other products will be found in a whole variety of special applications, such as gum inhibitors for gasoline, dopes for extreme pressure lubricants, and accelerators for the vulcanization of rubber.

In the future, coal tar intermediates will show further growth, both in tonnage and diversity of application. The development will undoubtedly be largely outside the old field of dyestuffs and medicinals. The major tonnage products will of necessity be naphthalene or benzene derivatives since only these two coal tar hydrocarbons are potentially available for chemical purposes in amounts well in excess of the ordinary needs. Coal tar intermediates have entered a new phase in our economy —they have left their old base of colors and drugs, giving us new products to meet new needs.

Sales Development—

A New Technique

Part II

Last Month Our Authors Described the Need For a Centralized Department to Correlate Sales and Market Information With Laboratory Research. In This Article, the Functions and Operation of a Market Development Organization Are Discussed in Detail.

By Logan Grupelli, Manager, Market Development Department and J. Miskel, Assistant, National Oil Products Co. Inc.

IN our previous article we have shown how the constant, painstaking search made by alert chemical companies for new uses for their products can be effectively accomplished by a market development department. We explained its place and scope. Now we propose to take up exactly how such a department is set up and how it functions. However, before doing so, we will say a few words on departmental policies; in no other branch of endeavor is it more important to lay down a specific course of action, than in market development. Its functions are so ramified and tortuous that without a general policy for proper guidance, serious and costly mistakes can easily result.

Of course, department policies will vary with different circumstances and requirements. Nevertheless, the importance of instituting basic policies, based on experience, cannot be too strongly emphasized. In our company, these must be approved by the executives in charge.

The logic of establishing a firm ruling against the marketing of any product unless complete patent clearance is indicated is merely common sense. The same might be said of assurance of adequate raw material supplies for the production of the product to be marketed. Again, it certainly is obvious that no product should be marketed that does not conform with state and federal laws. These and many other similar sound policies should be adhered to.

On the other hand, there are many policies whose adoption will depend solely on circumstances appertaining to a particular business. For example, exploiting of products unrelated to present operations, marketing bulk or packaged goods, royalty payments in case of acquired patent rights, and many other similar considerations. Enough has been said, we believe, to indicate how essential it is to establish such policies at the very start.

Market development we described as a function which consists of creating new outlets by the application of technical knowledge and scientific methods on long term sales objectives. It, therefore, represents pioneer sales efforts and consequently requires time for investigation, and it is this factor of time upon which the necessity of differentiating such a department from regular sales rests.

This matter of time can best be illustrated by a well publicized process, namely: the use of high density liquids for coal classification. According to accounts, years elapsed from the original conception of this idea to its first successful commercial application. If we were to analyze this time factor, we no doubt would find a large part of it devoted to laboratory and engineering development.

A proportionate amount of time, we can be reasonably sure, must have been

Dr. Donald Price (head of table) leads conference of NOPCO technicians.

consumed in developing its practical application from a market standpoint. In so doing, surveys to determine the economic value of the process, to estimate the size and probable distribution, to establish limitations imposed on the process by other market conditions were undoubtedly undertaken. All this is merely another way of saying that time, and more time is needed in the development of a new product or process.

In our own company, the sales-research unit has been assigned a position wherein it is felt it can draw readily on the skill and knowledge of various supporting departments. Such an organization plan can be schematically represented for reasons of brevity by the chart which is reproduced below.

The heavy lines are intended to represent direct responsibility, while broken lines indicate a reversible and reciprocal flow of information, reports, and services among the various research and sales departments.

Freedom of Action

To refer further to the position of the sales-research unit, we feel that it is of paramount importance that it should enjoy a certain freedom of action, unfettered by the influence of any one department in the company. It will be appreciated that a unit directly responsible to research would be unduly influenced in that direction, while whole responsibility to sales might restrict activities to a point where they become essentially sales promotion. Therefore, it is important that the sales development unit report directly to the vice president or other executive in charge of the company's research policy and that he in turn coordinate with units reporting to him. This last is particularly important since the recommendations and findings of the sales development department are worthless unless they become an active part of the complete research program.

Departmental Functions

In actual operation the market development department functions somewhat along these lines:

A. Continual study of markets by surveys, literature, patents, etc., to keep in touch with industrial trends and as a possible guide for company's research policy.

B. Study of new products as they come out of the research laboratories to determine
   1. Possible application
   2. Competition
   3. Economic status
   4. Patent situation.

C. Evaluate uses suggested above by
   1. Laboratory tests
   2. Pilot plant tests
   3. Outside controlled plant trials.

D. Analysis of data.
   1. To determine limitations of product
   2. To suggest modifications of product
   3. To establish specifications.

E. Evaluate by market survey.
   1. The probable size of market
   2. The distribution and competitive factors.

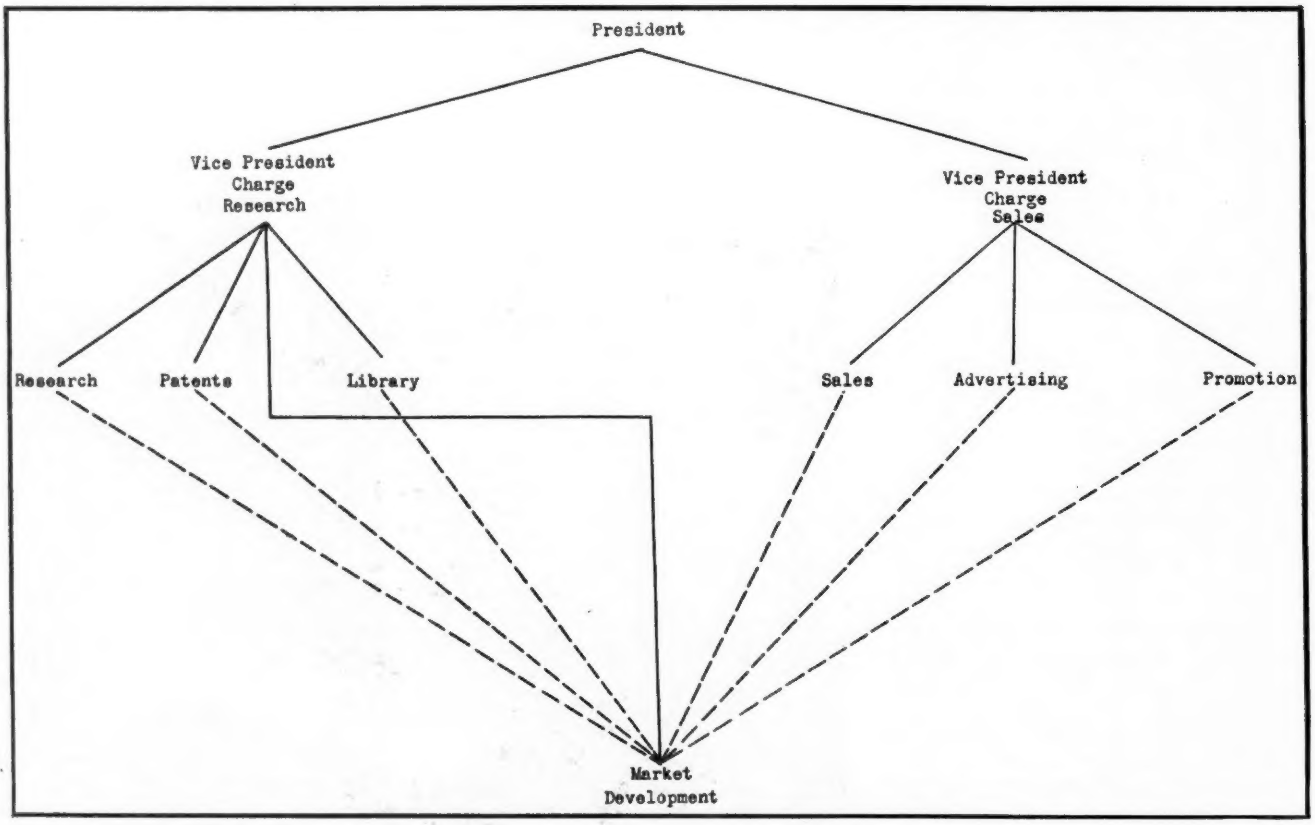
F. Analysis of findings and preparation of reports and recommendations to executive in charge.

Since there are few companies doing business today that do not have a well-organized and aggressive sales organization, the problem as we see it, is the organization of all the research integers into one interrelated, virile unit cooperating actively with sales. To emphasize this point: How many times has an expensive and lengthy research program been concluded only to find that the conditions accounting for its conception have changed either progressively or suddenly to render its final conclusions doubtful! Surely we can all point to several examples of apparently progressive companies caught "flat-footed" by a new and startling competitive development more or less outmoding or making prohibitive their present products or processes.

Testing New Developments

To sum up this point, our argument is that present day research can benefit immeasurably through a closer contact with sales, and that it become more sales conscious by testing its developments through a sales-research or development unit.

We have endeavored to present a picture of an agency and its interpretation. Yet, like all other undertakings, its success must depend to a large measure on proper execution. This in turn depends on efficient personnel: men having a well rounded technical and sales background with emphasis on analytical ability and research patience.



President Roosevelt signing bill extending Reciprocal Trade Agreement program for three years.

Reciprocal Trade Pacts

A Review of Their History and Effects

Six Years Ago Uncle Sam Began Wooing Foreign Markets Through Reciprocal Trade Treaties. To the Question: Have They Worked Well? Some Answer "Yes," Some Shout "No." Our Washington Editor Presents the Facts and Figures as They Apply to the Chemical Industry.

By

Russell Kent

Chemical Industries Washington Bureau

THE United States this month starts the seventh year of its reciprocal trade agreement policy. After a bitter Congressional struggle, especially in the Senate, the Administration won its fight for a second three-year extension of power to negotiate such pacts.

War has interrupted functioning of the majority of the trade agreements which have been signed, and it has influenced others. Negotiations with Chile, with Argentina, and with Uruguay have been suspended. Proposed revision of the agreement with Belgium is in suspense.

But when peace comes, if this law then be in effect, what will happen?

The Administration insisted upon having an extension of its authority to negotiate trade pacts, and without restriction such as approval of each agreement by Congress or approval by the Senate alone with the pacts considered as treaties, on the plea that the United States must be in a position to broaden its trade policy, invented by Secretary Hull and encouraged by President Roosevelt, as part of a wound-healing process in the "good neighbor" attitude when peace comes.

No one today knows when peace will be restored, nor who will be President then, nor what political party will control the machinery of government. But it is important to review the conditions brought about by the trade agreement policy in the light of potentialities.

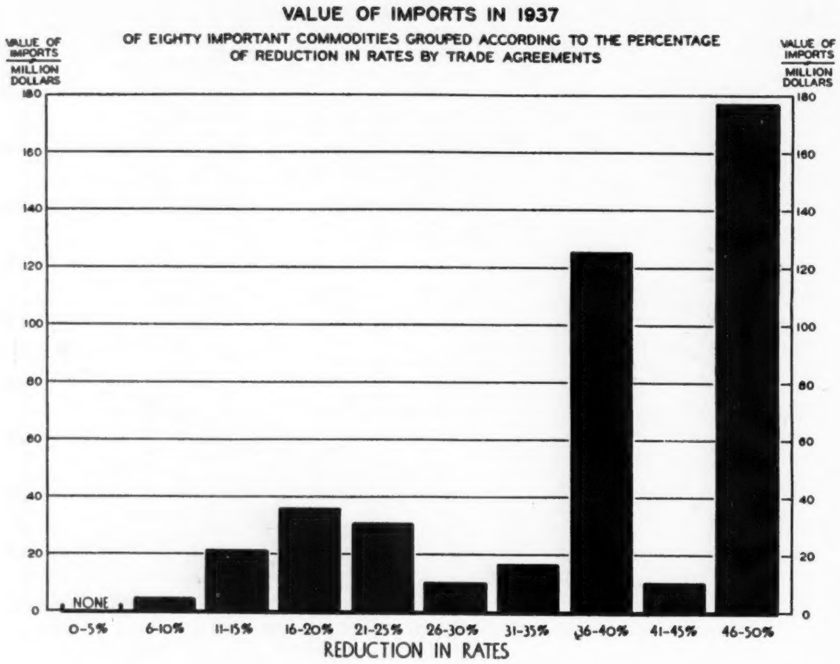
The fact is that in the 20 agreements which are in nominal effect today, there have been 1,077 items reduced in duty by the United States, of which 104 are in the chemical schedule. Tariff Commission figures show reductions in 1,012 items. The difference in number of items is due to the fact that in certain classifications there are several identified items within a single rate, and the Commission's total relates to the number of single rates while the other compilation refers to the number of identified items whose tariff duties have been reduced.

There has not been a single instance of rate increase, although under the law increases as well as decreases are permissible, within the range of 50 per cent. of the duty named in the Tariff Act. The entire tendency has been downward.

Reductions in tariff rates by the United States made in the trade agreements have been heavy. The Tariff Commission has made an analysis as to 80 items, each of which in 1937 accounted for imports valued at $1,000,000 or more. These include the Cuban pact not extended to other nations applying especially to sugar.

The Commission's chart on the following page, tells the story strikingly, for these 80 items account for about 78 per cent., in value, of all articles on which rates have been reduced by the pacts.

Of the $431,506,000 value of all these articles, the value of those reduced 10 per cent. or less was about $4,000,000; the value of those with duty reductions of 36 or 40 per cent. was about $125,000,000, of which sugar accounted for $104,000,000; while the value of those in which duty reductions ranged from 46 to 50 per cent. was $177,000,000.



bound against change on 38.3 per cent., these State Department figures show as to total imports. In 1937, dutiable imports constituted 41.4 per cent. and duty-free imports 58.6 per cent. of all imports.

These statistics also show that reductions in duty on non-agricultural products apply to 23.4 per cent. of total 1937 non-agricultural imports; another 3.4 per cent. were bound against increase, and continued duty-free, import entry was bound on 38 per cent., again omitting Cuba.

The State Department figures, it is emphasized, apply to the entire import lists in 1937, whether dutiable or free; hence the percentages of reductions appear low.

Tariff Commission figures show that as to dutiable imports in 1937, 42 per cent. would have been subject to reduced rates had all existing trade pacts been in effect that year.

State Department calculations, used in connection with the Senate debate on the extension resolution, show that the United States has obtained from foreign countries in these trade pacts concessions, including duty reductions, quota increases, and bindings of existing customs treatment, which account for 55.7 per cent. of the total value of imports of these countries from the United States on the basis of 1937 figures. This total consists of duty reductions or other relief from barriers as to 26 per cent. of our export trade with these countries and bindings of existing treatment accorded 29.7 per cent.

Examination of the concessions granted the United States shows that few chemical concessions, using the term in its strict sense, have been granted the United States. Most of the concessions in the schedule have involved such related products as proprietory medicines, pharmaceutical preparations, cosmetics, soaps and antiseptics. There have been some concessions on paint and related products.

The important trade agreements with the United Kingdom, France and Belgium—nations with large and well-organ-

It is illuminating to recall that all of these agreements are multi-lateral so far as concerns concessions granted by the United States, because every country with which we have a most-favored-nation treaty is entitled to share in the concessions granted any one country. But in concessions granted to the United States, the agreements are uni-lateral; no other country is bound to grant the same concessions to the United States.

Furthermore, not everyone realizes that every item included in a trade agreement automatically is removed from Section 336 of the Tariff Act, the flexible tariff provision, so that no relief to meet changed competitive conditions can be obtained under that law. Furthermore, certain rights of appeal to the Customs Court are denied as to items included in the pacts.

There is a clause which provides for changes to meet depreciated currencies. It has not been used, even in this period of war. The closest approach is the Treasury order that imports from the United Kingdom be assessed at the "official" quotation of the British pound sterling rather than the lower "unofficial" rate, and imports from Canada at the "official" Canadian dollar. The anti-dumping act rarely is invoked in recent years and the countervailing duty provision, Section 303 of the Tariff Act, has been invoked mainly as to Germany. Recently, old countervailing orders against Italian silks have been revoked in order to encourage friendly relations with that nation although there had been no change in the situation which brought about the original orders.

The chemical industry has not been subjected to greater rate reductions than others in the agreements which have been negotiated thus far. The metals, agriculture, and sundries schedules have had more reductions.

But more than half the 104 reductions made in the chemical schedule have been in the 40-to-50 per cent. range, a distinction shared with the wood, the spirits and wines, and the agriculture schedules.

Table 1 (Tariff Commission) shows the number of dutiable items on which rates have been reduced, by schedules, and the percentage range of these reductions by number of items.

But the story of tariff rate reductions does not paint the full picture. Omitting the Cuban agreement, which has especial elements inasmuch as it alone does not carry concessions to other foreign countries as well as itself, State Department figures show that reductions in duty apply to 15 per cent. of total imports, dutiable and free, by value, on the basis of 1937 figures, the latest available detailed data.

In addition, existing duties were bound against upward change on another 2.1 per cent. and existing duty-free entry was

Table 1. Rate concessions in reciprocal trade agreements, number of items showing percentage range of reductions

	Schedule	*0-9%*	*10-19%*	*20-29%*	*30-39%*	*40-50%*	*Total*
I	Chemicals	..	12	19	19	54	104
II	Ceramics	1	2	18	40	35	96
III	Metals	2	31	50	45	118	246
IV	Wood	..	..	3	1	10	14
V	Sugar	..	..	..	3	2	5
VI	Tobacco	..	..	1	2	1	4
VII	Agriculture	1	4	44	21	101	171
VIII	Spirits & Wines	..	..	..	2	14	16
IX	Cotton	2	10	18	11	9	50
X	Flax, Hemp, Etc.	3	3	11	12	17	46
XI	Wool	6	20	14	16	7	63
XII	Silk	..	5	9	3	5	22
XIII	Rayon	..	2	5	1	1	9
XIV	Papers & Books	1	3	17	10	19	50
XV	Sundries	4	17	54	42	64	181
	Totals	20	109	263	228	457	1,077

(Not including Cuba which was a Revision of the Preferential Commercial Treaty concessions not being extended to other countries.)

ized chemical industries—contain no rate reductions on straight chemical products.

Comparison of chemical concessions made by the United States with those granted this country in the trade pacts demonstrates that the chemical indusry has lost much more than it has gained under this program.

More importantly, however, there is the secondary impact upon the domestic chemical market caused by concessions granted on a wide variety of finished products into which chemicals enter—textiles, leather, paper and pulp products.

Every ton of these products shipped into the United States reduces the market for domestic chemicals by a definite quantity. Thus, a survey of effects of the trade agreement program upon the United States chemical industry must include not only concessions on chemicals but the general reduction in a large variety of manufactured products into which chemicals enter.

Statistics Require Study

Statistics on effects of the trade pact program must be studied closely to get the full import of the figures. Tariff Commission figures, for instance, show that imports in 1937 under the chemical schedule were valued at $83,314,000; that the computed duty on dutiable imports in that schedule at pre-agreement rates would be $30,885,000; and including agreement items at agreement rates the computed duty would have been reduced to $28,924,000. The equivalent ad valorem rate of duty including agreement items at pre-agreement rates would have been 37 per cent., and at post-agreement rates it would have been 35 per cent., thus giving the average reduction in rates as 6 per cent. Table 2 (Tariff Commission) shows these figures by schedules of the Tariff Act.

Table 3, from Tariff Commission compilations, shows that of the $83,314,000 value of chemical schedule imports in 1937, $19,138,000 would have been subject to reduced rates under trade agreements now in existence, a proportion equivalent to 23 per cent. In comparison with the spirits, sugar, wood, and metals schedules, this is a modest proportion.

Tariff Commission statistics, in Table 4, show that of the $19,138,000 chemical schedule imports in 1937 which would have been subject to reductions in rates under trade agreements, the average reduction would have been 31 per cent. (an equivalent ad valorem of 22 per cent. contrasted with 32 per cent. at pre-agreement figures) and that the duty would have been $4,145,000 at post-agreement figures compared with $6,106,000 at the former rates.

Potentially, the most important trade agreements which have been negotiated are those with the United Kingdom and Canada, the latter having been revised by a supplemental agreement.

Table 2. Imports of dutiable commodities, with computed duties at trade agreement and pre-agreement levels, and the ad valorem equivalents thereof, by tariff schedules, 1937

Tariff schedule	Total value of dutiable imports	Computed duty on total dutiable imports: Including agreement items at pre-agreement rates	Including agreement items at agreement rates	Equivalent ad valorem: Including agreement items at pre-agreement rates	Including agreement items at agreement rates	Average reduction in rates
	Thousands	*Thousands*	*Thousands*	*Per cent.*	*Per cent.*	*Per cent.*
1. Chemicals, oils, and paints	$ 83,314	$ 30,885	$ 28,924	37	35	6
2. Earths, earthenware, and glassware	36,957	19,022	17,990	51	49	5
3. Metals and manufactures of	114,180	46,800	35,134	41	31	25
4. Wood and manufactures of	19,861	4,163	3,030	21	15	27
5. Sugar, molasses, and manufactures of	126,616	70,879	45,165	56	36	36
6. Tobacco and manufactures of	31,776	25,468	21,788	80	69	14
7. Agricultural products and provisions	310,147	113,630	103,150	37	33	11
Fish and fish products	26,890	6,031	5,416	22	20	9
Other	283,257	107,599	97,734	38	34	11
8. Spirits, wines, and other beverages	74,973	88,058	45,637	117	61	48
9. Cotton manufactures	44,052	17,855	16,378	40	37	8
10. Flax, hemp, jute, and manufactures of	77,656	20,136	15,644	26	20	23
11. Wool and manufactures of	82,560	54,037	49,647	65	60	8
12. Silk manufactures	8,736	5,101	4,748	58	54	7
13. Manufactures of rayon or other synthetic textile	7,499	3,435	3,240	46	43	7
14. Papers and books	15,113	3,563	2,599	24	17	29
15. Sundries	169,063	53,417	48,278	32	29	9
Free list[1]	42,102	11,804	11,650	28	27	Negl.
Total dutiable	$1,244,605	$568,253	$453,002	46	36	22

[1] Includes only those items that are subject to excise taxes on importation.

Note: This computation takes into account duty reductions made by all agreements except that with Czechoslovakia. Imports of sugar from Cuba have been included at the reduced trade agreement rates, although during the period from Sept. 12, 1939, to Dec. 26, 1939, inclusive, the pre-agreement rates were in effect as a result of the temporary suspension of the quota system under the Sugar Act of 1937.

Table 3. Proportion of imports subject to reduced trade agreement rates of duty, by tariff schedules, 1937

Tariff schedule	Total value of dutiable imports	Value of imports subject to reduced rates[1]	Proportion subject to reduced rates
	Thousands	*Thousands*	*Per cent.*
1. Chemicals, oils, and paints	$ 83,314	$ 19,138	23
2. Earths, earthenware, and glassware	36,957	7,685	21
3. Metals and manufactures of	114,180	69,390	61
4. Wood and manufactures of	19,861	14,780	74
5. Sugar, molasses, and manufactures of	126,616	105,810	83
6. Tobacco and manufactures of	31,776	23,488	74
7. Agricultural products and provisions	310,147	88,139	28
Fish and fish products	26,890	9,979	37
Other	283,257	78,160	28
8. Spirits, wines, and other beverages	74,973	69,084	92
9. Cotton manufactures	44,052	14,840	34
10. Flax, hemp, jute, and manufactures of	77,656	28,619	37
11. Wool and manufactures of	82,560	24,510	30
12. Silk manufactures	8,736	2,506	29
13. Manufactures of rayon or other synthetic textile	7,499	1,127	15
14. Papers and books	15,113	9,241	61
15. Sundries	169,063	34,734	21
Free list[2]	42,102	5,479	13
Total, dutiable	$1,244,605	$518,570	42

[1] Figures include imports that actually entered at reduced agreement rates in 1937 with the additions of imports in that year on which the rates were subsequently reduced by the Ecuadoran, the United Kingdom, the second Canadian, and the Turkish agreements. Imports of the latter class, partly estimates, include imports (if any) from Germany and Australia. Imports from Cuba of commodities on which rates were reduced by the Cuban agreement are included.

[2] Items subject to excise taxes on importation.

Table 4. Imports subject to rates of duty reduced by trade agreements, 1937

Tariff schedule	Value of imports subject to reduced rates[1]	Computed duty on items subject to reduced rates: At pre-agreement rates	At agreement rates	Equivalent ad valorem: Pre-agreement rates	Agreement rates	Average reduction in rates
	Thousands	*Thousands*	*Thousands*	*Per cent.*	*Per cent.*	*Per cent.*
1. Chemicals, oils, and paints	$ 19,138	$ 6,106	$ 4,145	32	22	31
2. Earths, earthenware, and glassware	7,685	3,081	2,049	40	27	32
3. Metals and manufactures of	69,390	32,046	20,381	46	29	37
4. Wood and manufactures of	14,780	2,378	1,246	16	8	50
5. Sugar, molasses, and manufactures of	105,810	64,279	38,565	61	36	41
6. Tobacco and manufactures of	23,488	20,546	16,866	88	72	18
7. Agricultural products and provisions	88,139	25,976	15,495	30	18	40
Fish and fish products	9,979	1,669	1,054	17	11	35
Other	78,160	24,307	14,441	31	18	42
8. Spirits, wines, and other beverages	69,084	85,054	42,633	123	62	50
9. Cotton manufactures	14,840	5,558	4,082	38	28	26
10. Flax, hemp, jute, and manufactures of	28,619	10,841	6,349	38	22	42
11. Wool and manufactures of	24,510	16,615	12,221	68	50	26
12. Silk manufactures	2,506	1,488	1,135	59	45	24
13. Manufactures of rayon or other synthetic textile	1,127	1,169	974	104	86	17
14. Papers and books	9,241	2,465	1,501	27	16	41
15. Sundries	34,734	16,330	11,197	47	32	32
Free list[2]	5,479	307	153	6	3	50
Total, dutiable	$518,570	$294,242	$178,992	57	35	39

[1] These figures include imports that actually entered at reduced agreement rates in 1937 with the addition of imports in that year on which the rates were subsequently reduced by the Ecuadoran, the United Kingdom, the second Canadian, and the Turkish agreements. Imports of the latter class, partly estimates, include imports (if any) from Germany and Australia. Imports from Cuba of commodities on which rates were reduced by the Cuban agreements are included.

Imports of sugar from Cuba have been included at the reduced trade agreement rates, although during the period from September 12, 1939, to December 26, 1939, inclusive, the pre-agreement rates were in effect as a result of the temporary suspension of the quota system under the Sugar Act of 1937.

[2] Items subject to excise taxes on importation.

The United States chemical industry should be benefitting from the second Canadian agreement, along with some other industries. The Dominion concessions include not only flat rate reductions but removal of orders in council which raised barriers, such as modification of the 3 per cent. import tax on specific items. Decreases were made by Canada in the sodium compounds bicarbonate, bichromate, sulfite, and chlorate; and in sulfuric acid, chloroform, medicinal preparations, pyroxylin plastics, white lead dry and ground in oil, varnishes and lacquers, and magnesium carbonate for rubber.

In the British agreement, the United States gave more than it received, on the face of the figures. We granted concessions on 444 rates, froze 63 rates and bound 60 duty-free items. The United Kingdom granted reductions on 156 items, and bound 127 other rates and 25 items on its free list.

In this United Kingdom agreement, 37 chemical rates were reduced up to 50 per cent. by the United States. Imports of these items in 1937 were valued at $1,300,000. On the strictly chemical list, reductions include ammonium carbonate, cellulose acetate not made into finished articles, manufactures of cellulose film, precipitated chalk, precipitated magnesium carbonate, magnesium oxide, ultramarine blue, litharge, red lead, lead pigments n.s.p.f., and salt in bulk.

The United Kingdom bound several chemical items to existing tariff treatment, made a 5 per cent. reduction on soft and hard soap, a two and a half per cent. reduction on printer's ink, and a 5 per cent. reduction on oil varnishes. Concessions on chemical and allied products shipped from the United States into British possessions included turpentine and paint, to specific destinations.

What lies ahead no one can foretell. But it is noteworthy that no reciprocal trade agreement can be devised which can meet competition of those nations which can fix prices at will to promote exports or which can rely heavily upon barter arrangements.

And it is certain that when war ends, there will be a rush to expand foreign trade by all the nations which have participated. The issue of concealed export subsidies and of depreciated currencies will then have to be met squarely if United States industry is to have protection at home and is to compete in the export market.

Even the idealistic program of the United States is subject to modifications. Thus, when negotiations with Chile were in progress, mining interests protested against inclusion of copper in the list of commodities under negotiation, and the Administration, for the first time in any case, announced it would not make a concession on copper. And the canned beef issue brought a halt to negotiations with Argentina and with Uruguay.

These things happened before Congressional action on the extension of the trade pact law for three years from June 12. Even at that, however, the legislation barely squeezed through the Senate. The Pittman amendment, which would have required the trade pacts to be regarded as treaties and thus subject them to Senate ratification by a two-thirds majority, failed by three votes in the Senate. The resolution finally passed that body by a majority of five. But in the final vote it was demonstrated that only 18 States were solidly for the program, 14 were divided and 16 were solidly against it—using the actual vote, the pairs, and the announced position of Senators.

Chemical Industry Factors

If, with peace restored, the trade pact program should be pursued by the United States as it has been in the past, there are certain factors of deep concern to the chemical industry that are involved.

In the proposed revision of the agreement with Belgium, for example, a list of possible concessions include ammonium nitrate; sodium sulfide; sodium phosphate; alumnium sulfate, commercial and iron free; ammonium chloride; zinc chloride; and hexamethylenetetramine.

This is an illuminating list. Ammonium nitrate is a key product in national defense. Sodium phosphate, sodium sulfide, zinc chloride and aluminum sulfate have sold at or below cost of production at periods in the recent past and could not bear competition with imports at reduced tariff rates happily, to say the least. Hexamethylenetetramine is not only an important medicinal but it has a variety of important commercial uses as well.

In the trade agreement negotiations with Chile, the United States tentatively offered to bind sodium nitrate on the free list. The position of sodium nitrate has changed in this war compared to the one 25 years ago, yet all other industrial nations have granted protection to the synthetic nitrogen industry and it is essential in the event of national emergency.

The reciprocal trade agreement program is practically dormant today, due to war alone. Should war cease tomorrow, the chemical industry and all industry would be confronted with its revival in directions unknown now but certain to upset business calculations in a time when certainty will be difficult at the best.

CHEMICAL ENGINEERS and Industry

By Charles M. A. Stine

Vice-president and Director of Research, E. I. du Pont de Nemours & Company

Dr. Stine here tells how a new type of engineer adapts materials and energy to the requirements of an industrial age. A biographical sketch of our distinguished author appears on p. 742 of this issue.

MANY observers consider chemical engineering to be purely a technical vocation. However, as chemical engineering further penetrates industry in its research and production aspects, changes in the type of distribution and management personnel also become apparent. For example, the decade 1920-1930 was characterized by a rapid influx of chemical engineers into the research and development departments of the petroleum refining companies. Today these men are found not only in charge of research and other technical activities, but in charge of refineries, in sales organizations, and in general administrative positions.

This penetration of chemical engineering throughout all branches of an industry, including management, has had a profound effect. Visualize if you will a chemical engineer in a paint factory, or in a fertilizer mixing factory, or in a pottery works, or in a tannery, or in a cotton textile plant. Visualize the tradition based on generations of empirical knowledge. Then visualize a man who thinks of paint, for instance, not only as an aggregate of pigments, oils, and thinners, but in terms of particle size, covering power, wetting properties, oxidation, and film characteristics. As you visualize the chemical engineer in such industries, it is apparent why tremendous strides have been made in recent years.

When the chemical engineer enters the old, long-established industries, he brings a point of view so independent as to transcend centuries of inertia and tradition. Although the chemical engineer respects tradition, he does not worship it. To him, tradition is a starting point for better things rather than a restraint.

The time is not far distant when chemical engineering will be considered an excellent preparation for leadership, not alone in manufacturing industry, but in many other fields such as transportation, trade, finance, agriculture, and the civil service.

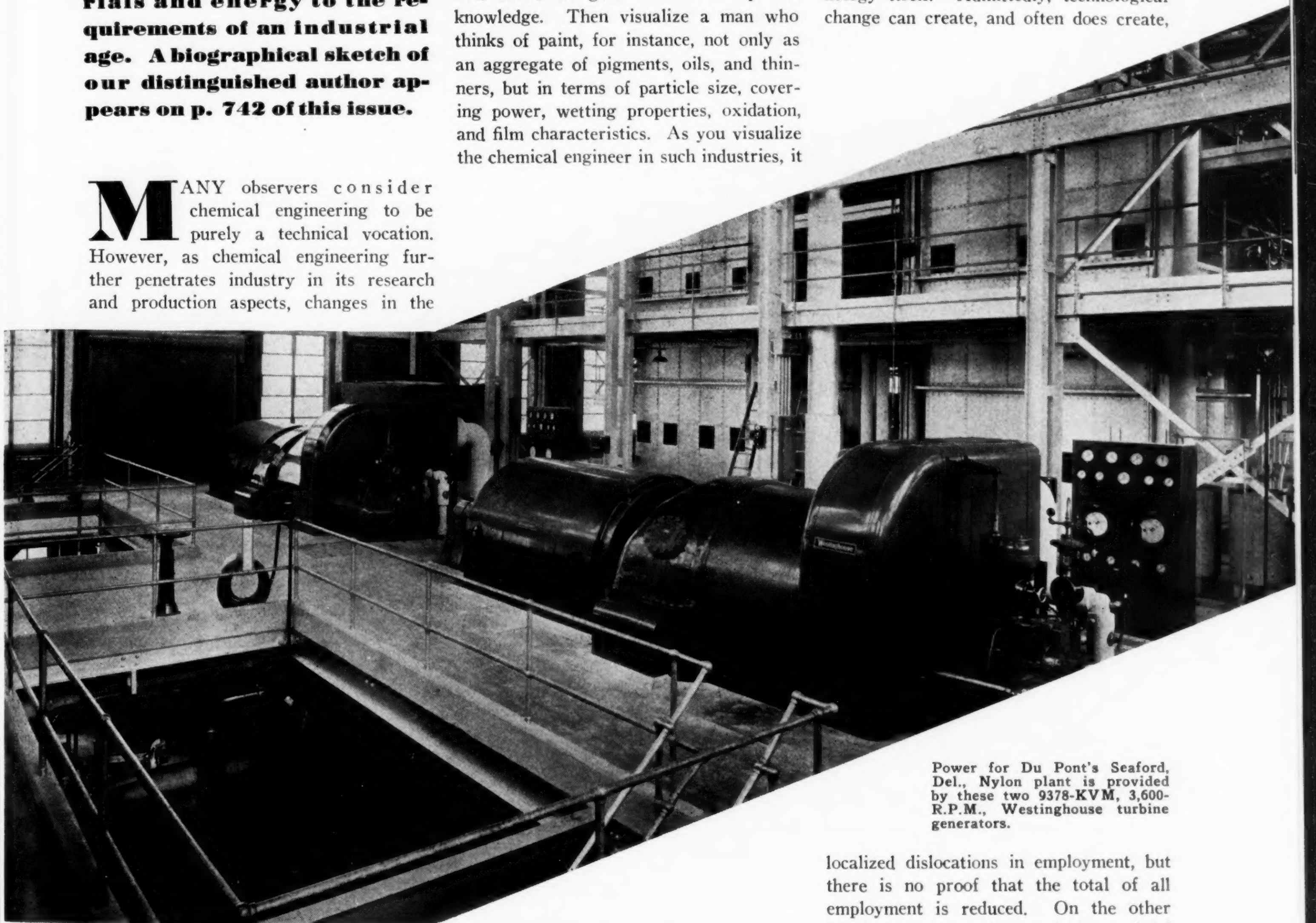
Chemical engineering is a philosophy affecting all relationships which involve energy and materials. Chemical engineering is a broad cultural subject. Chemical engineering is the means of acquiring an intensely utilitarian point of view.

The charge that technological advance causes unemployment is as old as technology itself. Admittedly, technological change can create, and often does create, localized dislocations in employment, but there is no proof that the total of all employment is reduced. On the other hand there is ample proof that gainful employment has increased at a rate greater than the population. The answer is found in a recent report of the National Industrial Conference Board covering employment trends in the United States for periods of 50 years and more. The Board reached the following conclusions:

(1) Employment has increased at a rate much greater than population. While population increased 118 per cent., the proportion of employed persons in the population increased 191 per cent.

(2) In 1870 only 324 persons in 1,000 of population were gainfully employed, whereas in 1930 the ratio of gainfully employed was 400 in 1,000 of population.

(3) In the period 1850 to 1933, the per capita wealth increased from $308 to $3,500 and the annual wage of industrial workers increased nearly five-fold, although in the same period the working hours a week decreased nearly 50 per cent.



Power for Du Pont's Seaford, Del., Nylon plant is provided by these two 9378-KVM, 3,600-R.P.M., Westinghouse turbine generators.

Portion of the cellroom of Hooker Electrochemical Company, Niagara Falls, visited by engineers. Cells shown have the deposited asbestos diaphragm for which several direct advantages are claimed over the usual asbestos paper diaphragms.

The charge is also made that the 9,000,000 now reported as unemployed never will be put back to work. Let me say that at no time in American history has there been an accurate census of unemployment. According to competent economists, the figure of 9,000,000 unemployed is a fictitious figure. They point out that even in the most prosperous times, at least 5 per cent. of the male population of employable age make no effort to obtain employment. These are the chronic unemployed. This alone accounts for not less than 2,500,000 persons, many of whom, though shiftless, are "on relief." Moreover, as Roger Babson has said, "Twenty-five years ago women in homes and boys on farms or in schools were reported as jobless; whereas today they are put down as 'unemployed' and possibly are 'on relief.'"

As far as chemical engineering is concerned, nearly every industry with which it is importantly identified has shown important gains in employment since 1929. I refer, for example, to such industries as dyestuffs and other synthetic organic chemicals; alkalies and nitrogen fixation; rayon and cellulose film; plastics, electrochemicals; ferro-alloys and electrometallurgical products; and petroleum refining. These industries as we know them today are creations of the chemical engineer and other scientists. They represent wealth, increased employment, and progress in the art of living.

Let me now comment more specifically regarding recent advances in a number of important industries. As far as practicable, the discussion will cover the period since 1928, or approximately a decade preceding the preparation of this paper.

Finishes

Principal among developments since 1928 is the use of synthetic resins in finishes. Such resins, largely of two types, the alkyd resins and the phenol-formaldehyde resins, are replacing fossil gums and other natural resins. Moreover, to a considerable extent the synthetic resins are replacing drying oils as such. Increasingly, the demand is for finishes that dry rapidly and that are hard and tough. Synthetic resin finishes satisfy this demand.

Automobiles, refrigerators, and metal furniture typify the mass-production field for which the synthetic resin finishes are so well adapted. In this field as with other steel-base products such as railroad rolling stock and ships, a priming coat is used. Formerly the priming coat was an oleo-resinous paint, as only this type of paint was sufficiently adherent to dirty metal. However, advances in the metal cleaning art permit the use of priming coats based on synthetic resins. As a result, modern priming paints are quick drying, hard, firmly adherent, and wholly compatible with the surface coatings.

Improvements in nitrocellulose lacquers have resulted from combinations of nitrocellulose with synthetic resins. In this way, finishes suitable for fabrics, floor coverings, leather, and paper can be formulated.

Food

The application of knowledge concerning heat transfer to the quick freezing problem has, in about the last eight years, increased the freezing capacity per unit of floor space by about 600 per cent. and has decreased the investment per refrigeration unit by 25 per cent. or more.

The pre-treating processes which have for their major purpose the destruction of enzymes and bacteria without appreciable destruction of vitamins or other physical or flavor characteristics of the food have made extensive use of the simpler chemical engineering processes such as heat treating.

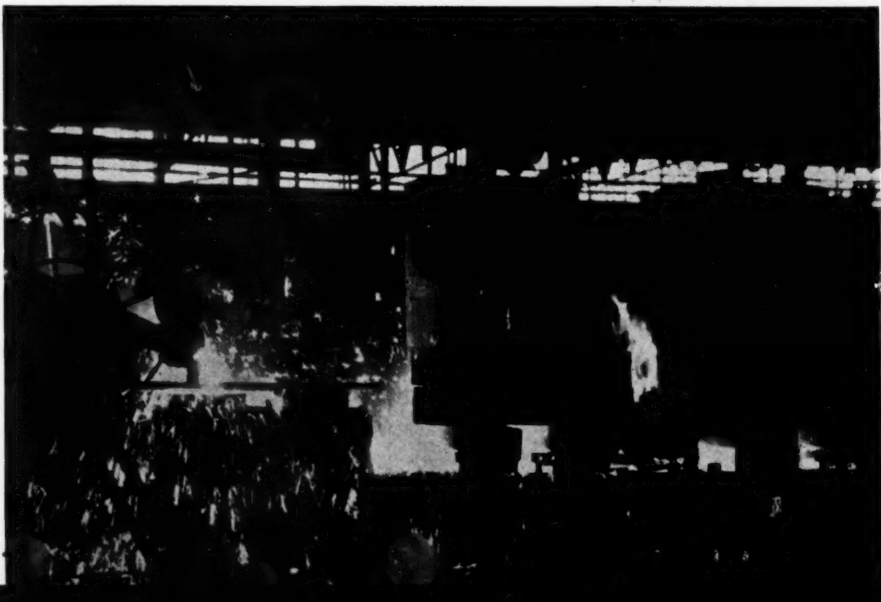
In the preliminary preparation of vegetables for quick freezing the principles of hydraulic separation are used extensively in interesting fashion. For example, a separation of tough peas from tender peas is made by gravity separation in brine, the specific gravity of which is controlled by the salt concentration.

Another example of the effect of chemical engineering on a food product is the prevention of caking of salt and fine sugar by means of fillers. The most important filler, tri-calcium phosphate, underwent considerable improvement as a result of chemical engineering research before reaching its present state of effectiveness. Anhydrous crystals of cerelose and citric acid are much more resistant to caking than the corresponding product having water of crystallization.

One of our oldest food industries, the milling of wheat, involves two important chemical engineering processes—grinding and mechanical separation. In this case both the grinding and separation are difficult and require careful control, a fact that is only just beginning to be realized.

Even such an ancient art as the baking of bread has been enormously improved by the methods of the chemical engineer. Obviously the sifting of flour and mixing of dough can best be done by power driven machinery of a type familiar to the chemical engineer in other industries. Fermenting and conditioning and proofing of the dough require accurate and automatic temperature and humidity control for best results. Even baking and cool-

Members of A. I. Ch. E. in tour of Buffalo Foundry & Machine Company see a 150-ton casting poured.



ing are examples of the chemical engineering unit process classed as heat transfer. The baking of bread is essentially a chemical engineering process and has been greatly improved by the use of chemical engineering methods.

The de-caffeination of coffee represents an interesting example of solvent extraction with its accompanying steam distillation and drying. This process is, however, complicated by such factors as the release of the caffein from complexes in the bean brought about by steaming, the diffusion of caffein through water

This paper was prepared for presentation at Berlin Chemical Engineering Congress in June, 1940, and now definitely postponed. It was presented by title at Buffalo meeting of the American Institute of Chemical Engineers, held May 13-14, 1940.

in the bean to the solvent interface, all of which lengthen the total extraction cycle. The application of chemical engineering principles to this process has greatly decreased the length of this cycle, resulting in a final product much more comparable in quality with regular coffee. Costs are considerably lowered.

Chocolate is said to be the most popular flavoring used and the manufacture of cocoa products is rather an extensive industry. Here again such chemical engineering processes as separation and grinding, controlled crystallization and heat transfer play an important part in the production of the high quality products now being obtained.

The selection of proper materials of construction is a chemical engineering function. The use of stainless steel, monel metal, nickel, and glass and silver lining in the construction of food processing equipment has resulted in increased purity of almost every food product subjected to processing.

Glass

Of recent interest is a new borosilicate glass the expansion coefficient and softening point of which approach those of quartz. The new glass is much superior to the best previous low-expansion glasses. It is made by heat treating borosilicate glass into two distinct phases, one high in silica and the other nearly free of silica and very soluble in acids. The soluble phase is leached out, and the remaining high-silica phase is shrunk by firing to a clear solid mass.

A new type of safety glass has been developed in which the interlayer is polyvinyl acetal resin. At 0° C. the new safety glass is truly safe as compared with other types heretofore used. Moreover, the new glass is extremely resistant to degradation by sunlight and may be cut when cold, without heating the interlayer. Until 1932 pyroxylin plastic interlayer was used, after which cellulose acetate plastic interlayer began to supplant pyroxylin. Now it appears that the acetal resin interlayer will supplant cellulose acetate.

Fibrous glass has developed rapidly in the past few years. A new company has been formed by two leading glass companies and will produce a product known as Fiberglas. These companies have spent $5,000,000 to develop glass fiber suitable for such uses as thermal insulation, electrical insulation, and filter cloth.

Nitrogen

The rise of the synthetic nitrogen industry in the United States has been particularly significant. Production has increased from 50,000 tons of nitrogen in 1928 to 200,000 tons in 1938. Capacity is sufficient to supply the nation's requirements in war as well as in peace.

Production of synthetic nitrate of soda was begun in 1928. Following this was the urea synthesis, from which stemmed three products: urea ammonia liquor and solid urea for fertilizer use, and solid urea for chemical use. The technique of ammonia oxidation has been developed to high degree.

The ammonia synthesis has provided a technique by which other chemical reactions are practiced, as for example the alcohols synthesis and acids synthesis based on coke water gas. Thus it is probable that the volume of organic chemicals produced by high pressure technique will soon exceed the volume of ammonia.

Nitrogen consumption in agriculture has progressed steadily from 318,000 tons in 1928 to more than 400,000 tons in 1938. This is a favorable condition and reflects the low price of fertilizer nitrogen.

Visiting engineers inspected the synthetic ammonia plant of Mathieson Alkali plant, a modification of the Haber process, operating at 300 atmospheres and about 500° C. over a very active iron catalyst. Above, workman tests ammonia for moisture content.

Petroleum Refining

In petroleum refining, marked advances have been recorded. Solvent refining of lubricating oils is extensively practiced, accounting for about 50,000 barrels per day of refining capacity. The principal solvents in use are furfural, Duo-Sol (cresol and propane, used in countercurrent), phenol, Chlorex (dichloroethyl ether), sulfur dioxide and benzol (modified Edeleanu), and nitrobenzol.

The use of organic chemicals as additives continues in large volume. Most important among these is tetraethyl lead. While the use of tetraethyl lead began about 15 years ago, the greatest progress has been made in the last 10 years. Gasoline antioxidants are very widely used. A recent development is disalicylalethylenediamine as a deactivator for copper in gasoline.

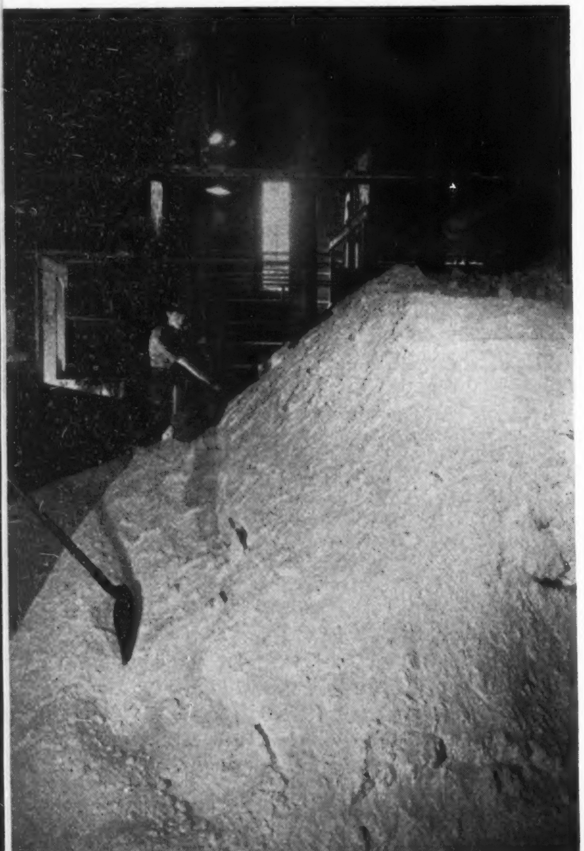
Among additives for lubricating oils are pour-point depressants, viscosity index improvers, film strengtheners (the extreme-pressure lubricant bases), oiliness agents, and antioxidants, as for ex-

ample, tributyl phosphite-tricresyl phosphate.

The polymerization processes are outstanding among recent achievements, as they potentially may yield 9 billion gallons of high-octane fuel annually. Moreover, they utilize gases that previously could not be marketed advantageously. The catalytic polymerization of isobutylenes followed by hydrogenation to iso-octane is important to aviation as it means the possible attainment of much higher compression ratios and efficiencies. It also means that new impetus may attach to the hydrogenation technique which was so active ten years ago.

Another achievement of first rank is the catalytic cracking of petroleum to give fuels of improved octane rating. Several companies have reported successful results with this new technique.

Advances in treating processes have been made. The copper chloride process in particular is making inroads in the caustic soda-litharge process.



Two views of Electro Bleaching Gas plant at Niagara Falls also on the plant inspection itinerary of members of the Institute. A slightly modified form of the Gibbs-Vooce type of diagram cell was seen in operation. At left, enormous salt stock pile; below, storage tanks.

Potash

Notable progress has been recorded by the potash industry. In 1914 there was no measurable production of potash in the United States. Imports amounted to 207,089 tons K_2O. During the World War $50,000,000 was spent in an endeavor to develop sources of potash. Yet, in 1918 the production was only 54,803 tons K_2O, amounting to 20 per cent. of the demand.

Owing to a sharp drop in prices after the war, the domestic industry developed very slowly. Not until 1928 did production exceed the 1918 figure. In 1928 production was 59,910 tons, and imports were 330,493 tons, indicating that the consumption of potash in 1928 was nearly double that in 1914. In 1938, however, production was 320,000 tons, and imports were 200,000 tons, indicating a further large increase in consumption, up to a consumption of more than 500,000 tons. Thus, domestic production of potash increased more than fivefold in the ten years 1928-1939.

The capacity for domestic production of potash is rapidly becoming sufficient to meet present needs. Production from natural minerals is shared approximately equally among three companies, one at Searles Lake, California, and two at Carlsbad, New Mexico. The Searles Lake production has been continuous since the World War.

Although potash was discovered in the Permian Basin of Texas and New Mexico as early as 1915, the magnitude of the deposits was not known until 1926 when the U. S. Government appropriated $500,000 for exploration. Vast sources of sylvite and polyhalite have been discovered. Authorities agree the Permian Basin contains enough easily recoverable potash to last "for centuries."

The first crude potash was shipped from the Carlsbad district in 1931. Two refining processes are used: In the one process, the sodium chloride is separated from the potassium chloride by fractional crystallization. The highest grade product contains 97 per cent. KCl, equivalent to 62 per cent. K_2O. In the other process, the purification by fractional crystallization is preceded by a selective flotation separation process.

Pulp and Paper

Demand from the rayon industry for stronger and whiter pulp has accelerated developments in the wood pulp industry. As a result, high quality rayon pulps are now produced from the New England spruce and from such hard woods as beech, birch, and maple; from western hemlock and spruce; and from southern pine.

Not only research, but better standards of manufacture have contributed to the marked improvement in the quality of high-alpha-cellulose pulps. The pulp mills now employ at least five times as many technologists as in 1928.

The direct use of chlorine bleaches, instead of lime bleaches, is a result of the demand for stronger, whiter pulps. Development of improved bleaching techniques has in turn promoted the growth of the kraft pulp process. Thus, bleached kraft pulp is competing with bleached sulfite. This trend is expected to continue.

The other major pulp product is newsprint. Recently a $6,000,000 mill was completed at Lufkin, Texas, to produce newsprint from southern pine.

The basis for a greatly expanded pulp industry in the Southern states is quite apparent. According to the Florida Forest Service, the stand of slash and other pine amounts to 199,000,000 acres. Conditions of high rainfall and warm climate favor rapid growth. Moreover, even as recently as 1937 the United States imported as much as 40 per cent. of its pulp consumption.

Rubber

In 1931 the researches leading to chloroprene rubber were published. This product, called neoprene, is a close chemical homolog of natural rubber and of Buna rubber. When vulcanized, it possesses many properties similar or superior to those of the corresponding products from natural rubber. Neoprene's resistance to hydrocarbon oils, heat, and oxygen has led to such uses as linings for gasoline hose, covering for belting, jackets for electrical cable, gaskets, and packings. In a free-trade market in which

neoprene is sold at four times the price of natural rubber, consumption has expanded to several million pounds a year.

Chlorinated rubber is produced by several companies and is used principally in modified form in paints. Although isomers of rubber have been known for more than a decade, these have been applied only recently. Pliofilm molding plastics, and Pliolite paints are among such products. These are especially resistant to alkalies. Rubber hydrochloride is used as an adhesive and in a transparent tough plastic film known as Pliofilm.

Polyvinyl chloride is plasticized to give a composition resembling cured rubber. It is resistant to oxygen, ozone, sunlight, oils, and oxidizing chemicals. It is produced as Koroseal, used in place of rubber, and in other forms in protective coatings and cements.

Important progress has been made with latex compositions. Whipped latex is cured into porous molded shapes for upholstery. Porous hard rubber shapes are derived from latex and are used in filters and as battery separators. Latex thread is widely used in elastic fabrics. The thread is formed by extrusion, followed by coagulation, drying and vulcanization.

Notable changes have occurred in vulcanization accelerators. Such early accelerators as thiocarbanilid, hexamethylenetetramine, and the di- and tri- phenyl guanidines have been largely supplemented by aldehyde amine accelerators of the type of polybutyraldehyde aniline and mercaptobenzothiazole.

Two methods of plasticizing rubber have come into general use: The use of plasticator machines which raise the rubber to a high temperature and give a uniformly plasticized product; and the use of oxidation catalysts, as little as one-quarter per cent. of which will halve the time required for breakdown.

Soap

Much recent progress has been recorded in this age-old industry. Continuous splitting of fats is practiced in several plants. The quality of fatty acids is thereby improved, and glycerine recovery is simplified. This development may lead to continuous processes for making soap.

Processes for continuous saponification of fats and oils, with recovery of glycerine, have been developed. In one process, the saponification is carried out under pressure and at elevated temperature. The glycerine and water are distilled off in a vacuum system, leaving the soap as an anhydrous powder.

A rapid saponification process has been developed in which an accelerator is used. The process is continuous and requires about two hours from raw materials to finish soap. Since the glycerine is left in the soap, the economy of the process depends upon the value of glycerine.

Crude glycerine is now refined continuously, using stills equipped for continuous salt removal.

Sodium hexametaphosphate and tetrasodium pyrophosphate have been used as assistants to soap in order to inhibit precipitation in hard water. Such assistants are necessary if soap is to compete successfully with the rapidly increasing use of "soapless" detergents of the fatty alcohol sulfate type.

Synthetic Organic Chemicals

Of the various recent advances in chemical industry, the most spectacular have been in the field of organic synthesis. This is indicated by the production index numbers, which show that the production index of various non coal-tar chemicals in 1936 was 278 compared with 1929 = 100. On the same basis, the Federal Reserve Bank Index of Manufactures in 1936 was 88.

In 1928, manufacture of synthetic methanol had begun. Production was approximately 2 million gallons. Yet in 1938, production had increased to 26 million gallons. Then came the production by the same technique of normal propanol, isobutanol, and other higher alcohols. Stemming also from coke water gas, through carbon monoxide and hydrogen, came the synthesis of acids, notably acetic acid and propionic acid.

Also in 1928 the production of ethylene glycol was well established. This, however, has proved to be only the first of many organic chemicals based on olefins; as for example, synthetic acetone, ethyl alcohol, ethyl ether, and the vinyl resins, all of which were announced in 1930.

In 1930 refrigerants of the dichlorodifluoromethane type were introduced. These are now used virtually exclusively in household refrigeration units.

Vitamin "C," ascorbic acid, is being synthesized from sorbitol, now made from corn sugar by a new electrolytic reduction process. Mannitol is made by the same process. Vitamin "D" likewise is being synthesized in quantity. It is being used in poultry foods and for human consumption.

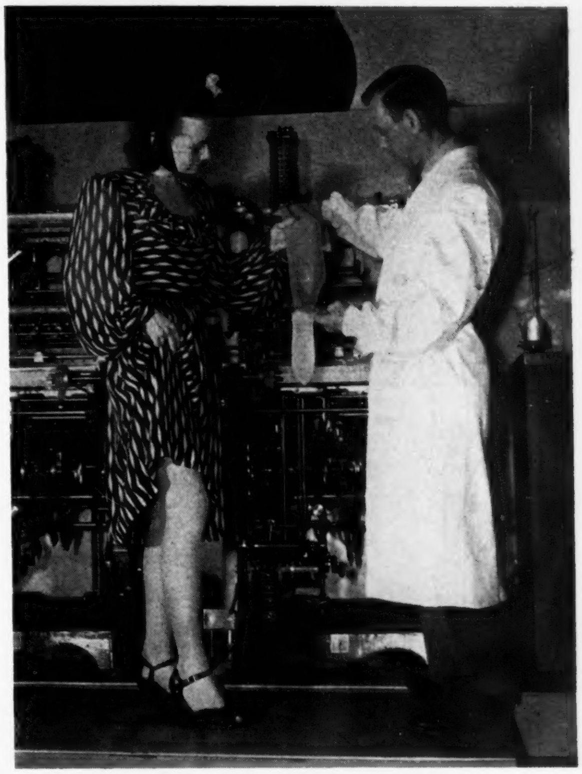
Cellulose ethers, notably ethyl cellulose, are being produced.

Synthetic urea, in the form of urea ammonia liquor, was announced in 1932 This was followed by the production of crystal urea in 1935. Capacity for urea production is sufficient for domestic requirements and permits exportation.

Synthetic camphor, based on American pinene, was announced in 1933. This industry also has made substantial progress.

Neoprene synthesis, an outgrowth of Nieuwland's fundamental researches leading to vinyl acetylene, was begun in 1931. Production has been expanded to several million pounds a year.

An entirely new group of polyamides,



Visitors to the Du Pont "Wonder World of Chemistry" exhibit at the New York World's Fair are shown how nylon stockings are knitted. The machines are standard hosiery knitting machines. In the background are the devices for seaming and finishing.

called nylon, was announced in 1938. Already textile fibers and monofilaments made of nylon are in commercial use. It can be made in other forms, such as films and sheets.

Synthetic Resins

The plastics industry, like the synthetic fiber industry and the synthetic organic chemicals industry, has had its greatest expansion in the past decade.

In 1929 the manufacture of urea-formaldehyde resins was begun. Other producers entered the field in 1931 and 1932. The urea plastics are well adapted to the molding trade. They mold economically into beautiful translucent white and light-colored tints.

Vinyl resins appeared in 1931. Until recently their consumption has been relatively small. Co-polymers high in vinyl chloride and low in vinyl acetate are adapted to molding. Moreover, such co-polymers can be spun into fibers for textile use.

Through hydrolysis, polyvinyl acetate is converted into polyvinyl alcohol and thence by treatment with an aldehyde, into polyvinyl acetal. The resulting acetal resins can be varied widely, according to composition, although as a class they are extremely tough and clear. As interliners they promise to dominate the safety glass field for some time to come.

The widespread use of phenol-formaldehyde resins and alkyd resins in quick-

drying finishes has been mentioned in another section.

Cellulose acetate plastics have developed rapidly and have an important place, especially for automotive and decorative purposes, such as steering wheels, knobs, panels, and lamp shades.

Of the newer resins, the methacrylates and acrylates are in several respects the most interesting. Methyl methacrylate polymer in particular should have a broad use. Its crystal-like clarity, complete freedom from color, low density, good light transmission, property of internal reflection, resistance to ageing, and ease of fabrication are commendable features. It is used in signs, in reflectors for automobile highways, and for a variety of novelty uses.

The old standbys, nitrocellulose plastic and phenolformaldehyde, have been greatly improved in quality and lowered in cost. For years believed to be a "dying" product, nitrocellulose plastic remains popular. Its extreme toughness, ease of fabrication, and low cost render it well adapted for pens, pencils, and toiletware. Special types of phenol-formaldehyde resins have been developed for molding, as for example, odorless and shockproof types for containers and closures; acid and alkali resistant types; shock-resistant and heat-resistant types.

Several important fabricating techniques have been developed, notably the extrusion process for making safety glass sheeting and the injection molding process, in which the fluid molding compound is forced into the mold cavity and maintained under pressure until it sets.

Textiles

The phenomenal gains made by rayon and the emergence of wholly new fibers are easily the most important advances in the textile industry.

Whereas in 1929 rayon production was 121 million pounds, the production in 1939 is expected to be 350 million pounds. In 1929 only 7 per cent. of the production was acetate rayon. In 1939 it had increased to 25 per cent.

Not only has the output of rayon increased nearly 200 per cent. in the ten years following 1929; the quality has been greatly improved. Both wet and dry strength have been increased; filament size has been decreased; and methods of delustering and finishing have been improved. Also in this short period of ten years the price of rayon yarn has decreased approximately 60 per cent.

In 1937, a year approximating 1939 in rayon, the rayon industry required 42,000 tons of purified cotton cellulose (equivalent to 180,000 bales of raw cotton linters) and 139,000 tons of wood cellulose. Although the proportion of cotton cellulose has decreased in recent years, the absolute quantity consumed has remained at a high level.

Contrary to popular belief, the synthetic fibers have not driven out natural fibers. For instance, cotton consumption for textile use was 3,105 million pounds in 1929 and 3,303 million pounds in 1937. Thus, in an interval of eight years, in which rayon consumption increased from 133 to 350 million pounds, cotton consumption increased 118 million pounds. Wool consumption in 1929 was 368 million pounds and in 1937 was 353 million pounds, a slight decrease.

Chief among the new substances from which fibers may be formed is nylon.

Nylon is a protein-like chemical product (polyamide) which may be formed into fibers, bristles, sheets and other forms which, when drawn, are characterized by extreme toughness, elasticity and strength. It is derivable from coal, air and water, or other substances. Nylon yarn differs from rayon in that it contains no cellulose.

The chemical definition indicates some of the many potential uses for nylon. Fine hosiery is one of the most promising of these. Other likely uses for the material are knit goods of many kinds, woven dress goods, bathing suits, underwear, bead cord, fishing lines, fishing leaders, sewing thread, draperies, and upholstery.

Uses for Nylon

Nylon is so versatile that the extent of its varied commercial uses can only be guessed today. Experimentally, it has demonstrated greater strength-elasticity factors than any fiber now in general use, whether cotton, wool, linen, rayon, or silk.

A pilot plant was put into operation in the summer of 1938 to produce limited quantities of nylon for experimental purposes. This plant has produced the nylon for the filaments now being marketed under the name of "Exton" nylon bristles for toothbrushes and hair brushes. The filaments have long life, do not shed, are little affected by water, and retain their firmness.

Nylon can be spun by extruding it when molten and cold drawing the resulting filaments. Cold drawing—stretching in the solid state—causes molecular orientation along the axis of the fiber. Fibers prepared in this way are continuous, straight, soft, smooth, and have a controllable lustre.

New agents have been developed for treating textiles. Among flame-proofing agents, ammonium sulfamate is particularly effective, as it does not degrade the fiber or fabric.

Among water repellents, "Zelan" new durable water repellent is of interest because of its remarkable resistance to dry cleaning and laundering. Fabrics treated with it are, for all practical purposes, permanently water repellent.

Having looked back let us now contemplate several things that may develop in the decade to come. Let us contemplate the primary material necessities of man—his food, clothing, and shelter.

In foodstuffs we shall witness a vastly greater application of chemical technology. The food processing industry, despite its commanding importance is the least developed of the giant industries. The phenomenon of a superabundance of crops accompanied by malnutrition of millions of people is reminiscent of the Dark Ages and must come to an end. I look to chemical engineering to provide the better coordination between production and consumption. Improved refrigeration is needed, in transit, in processing, and in storage. The techniques of quick freezing, dehydration, and extracting are certain to be greatly improved. It is equally certain that chemical engineering will find a larger place on the farm itself as a factor in greater efficiency in production.

Field of Housing

In the field of housing we shall witness important technical advances. Already there has been notable progress in mechanical equipment for the home, as for example, better services for heating, lighting, ventilation, refrigeration, cooking, and sanitation. Moreover, there have been important advances in materials of construction, as for example, in finishes, floor coverings, insulation, wall board, wall coverings, roofing, shades, sheathing, and metal sash. Nevertheless, the structural elements of the conventional house still are assembled largely according to handicraft methods. The resulting investment necessarily is high. The solution of the problem lies in the application of assembly-line factory techniques to structural units whereby the investment in housing is substantially decreased. Chemical engineering will facilitate mass production assembly by providing plastic materials from which standard structural shapes can be fabricated.

Despite many years of intensive development, the synthetic fibers account for less than 10 per cent. of the total consumption of textile fibers. Further progress in this field seems inevitable. Surely rayon will continue its growth. Other fibers such as nylon fiber and Lanital indicate what is to be expected in fields in which silk and wool have been dominant for centuries.

Chemical engineering, like other branches of science, is dedicated to the advancement of mankind. But chemical engineering, because it pertains to transformations of matter itself, is particularly adapted to provide better things for better living in the years to come.

"Headliners" In the News

Above—George W. Dolan, formerly assistant to President E. M. Allen of Mathieson Alkali Works, has been elected vice-president. Mr. Dolan, who is also a director of the company, was graduated from Western Reserve University in 1926.

George M. McGranahan, now assistant chief engineer at Dow's Midland plant, is being transferred to Freeport, Tex., to become Director of Production Engineering, at the new plant being erected by Dow Chemical.

Above—C. S. Glenn was elected vice-president of Mathieson Alkali at the same time as Mr. Dolan. He retains his title of director of operations. Mr. Glenn is an M. I. T. graduate.

Left—D. M. Houston has been appointed manager of Naval Stores export sales for Hercules Powder Company. Associated with Hercules since 1924, Mr. Houston went to Wilmington as a member of the Cellulose Products Department, transferring to Naval Stores in 1934.

Above—Dr. Robert Calvert, consulting chemist and chemical patent attorney, was elected chairman of New York section, A. C. S., at its annual meeting. Dr. Calvert assumes the office on July 1. Professor Louis P. Hammett of Columbia, retiring chairman, was named to the board of directors.

Right—R. T. Yates has been named manager of domestic sales of Hercules Naval Stores Department. Mr. Yates has been a member of the naval stores sales staff since 1930, and for the past few years has been in charge of special naval stores products sales.

Chemical Engineers at Buffalo

A record attendance (539) was reported at the 32nd Semi-Annual Meeting of the A.I.Ch.E. at Buffalo, May 13-15.

At the left, Dr. Webster N. Jones, Carnegie "Tech" and president of the Institute; Dr. Frank J. Tone, president, The Carborundum Co., and honorary chairman of the meeting; and Louis Blake Duff, Canadian newspaperman and author, who was the speaker at the banquet.

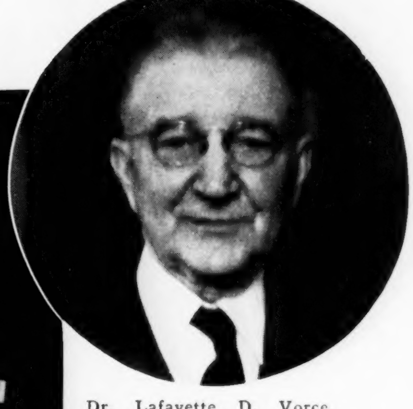
Above at right, Dr. James G. Vail, chemical director of Philadelphia Quartz and vice-president of the Institute.

Kenneth E. Stuart, Hooker Electrochemical Co., listens intently as one of the interesting papers is read.

Dr. Arthur D. Chambers E. I. duPont de Nemours & Co., Wilmington.

Robert Lindley Murray, chief engineer in charge of development, Hooker Electrochemical, who spoke on electrolytic alkali developments.

Robert L. Taylor, Monsanto, and chairman of the Institute's public relations committee discusses publicity with T. L. B. Lyster, chief engineer, Hooker Electrochemical, and chairman of the local sections public relations committee.



Dr. Lafayette D. Vorce, Westvaco Chlorine, who developed the Vorce Cell.

Dr. and Mrs. John C. Olsen, Polytechnic Institute of Brooklyn. Dr. Olsen is a former president of the Institute.

R. W. Hooker, sales manager, Hooker Electrochemical, poses with Dr. Martin H. Ittner, Colgate-Palmolive-Peet, and Dr. Ittner's daughter, Mrs. E. Sullivan.

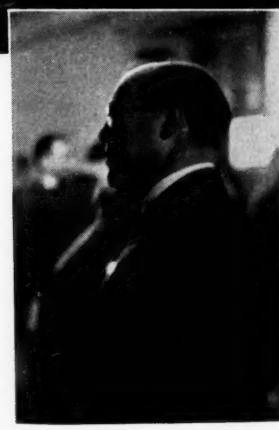
More personalities at the Buffalo meeting. Two movie camera enthusiasts work at close range. Left, S. L. Tyler, executive secretary of the Institute; right, W. L. Badger, Dow Chemical, 1940 winner of the William H. Walker Award, presented for outstanding contributions to chemical engineering literature published in the Institute's transactions.

Above, left: Dr. William W. Duecker, Texas Gulf Sulphur; right: Oscar v. d. Luft, plant manager, Cyanamid's plant at Bridgeville, Pa.

A. E. Marshal, president, Rumford Chemical Works, and a past president of the Institute.

At extreme right: Robert B. MacMullin, director of research, Mathieson Alkali, and general chairman of the Western New York Section's Committee of Arrangements for the Buffalo meeting; Dr. Ralph K. Strong of Rose Polytechnic Institute.

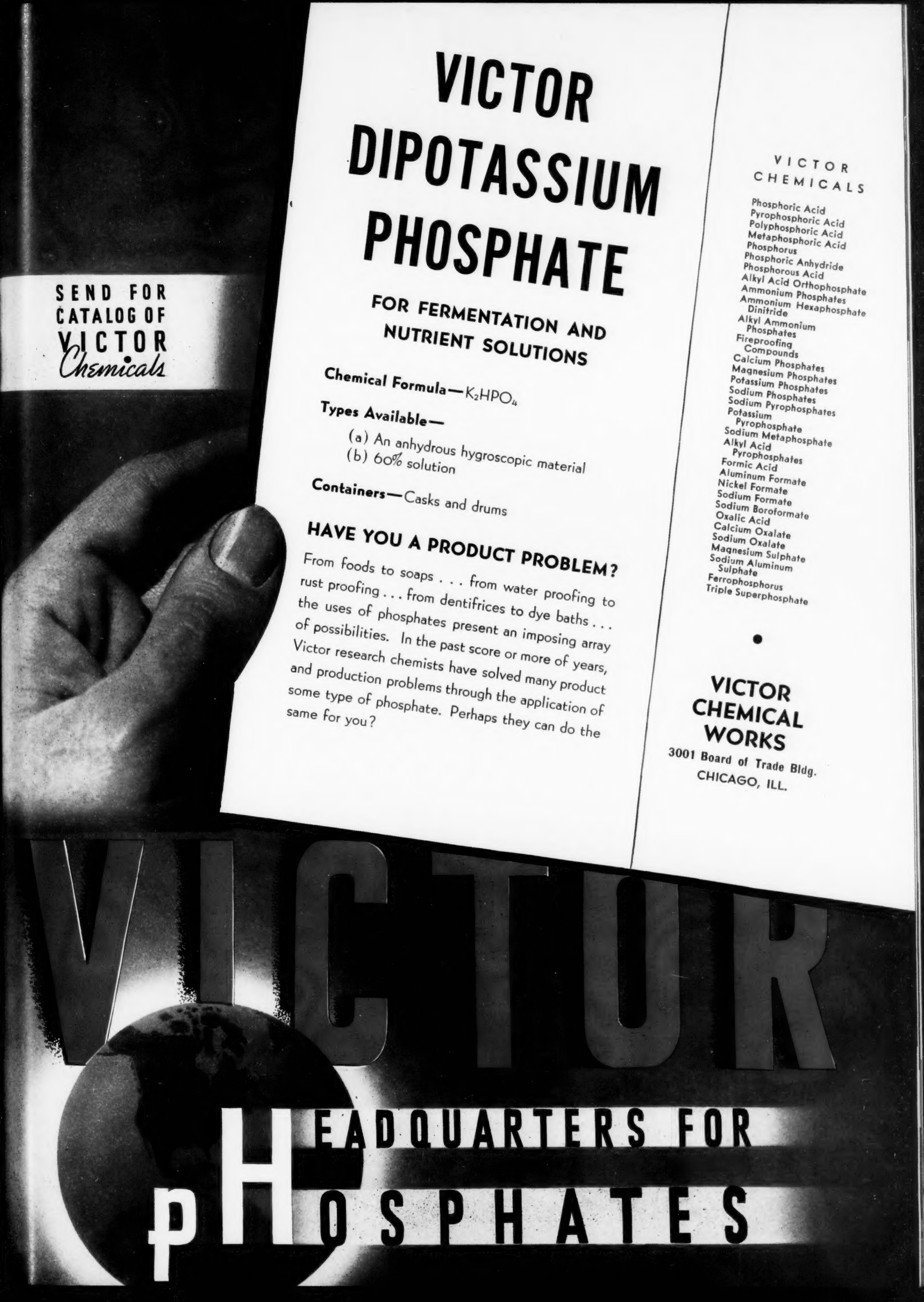
Left: H. D. Miles, president of Buffalo Foundry & Machine, who acted as host to the visiting engineers during an inspection trip of the company's plant.



Above: Edward A. Rykenboer, general manager of the R. & H. Chemicals Department of DuPont, who was host at a laboratory inspection of the Niagara Falls Works.

Below, left: Dr. Ivan Gubelmann, chemical director of Du Pont's organic chemical department; right: Gaston F. Du Bois, Monsanto vice-president.

Left: Max E. Bretschger, vice-president, Buffalo Electrochemical; right: Dr. Emil R. Riegel, University of Buffalo.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Ammonium Hexaphosphate Dinitride
Alkyl Ammonium Phosphates
Fireproofing Compounds
Calcium Phosphates
Magnesium Phosphates
Potassium Phosphates
Sodium Phosphates
Sodium Pyrophosphates
Potassium Pyrophosphate
Sodium Metaphosphate
Alkyl Acid Pyrophosphates
Formic Acid
Aluminum Formate
Nickel Formate
Sodium Formate
Sodium Boroformate
Oxalic Acid
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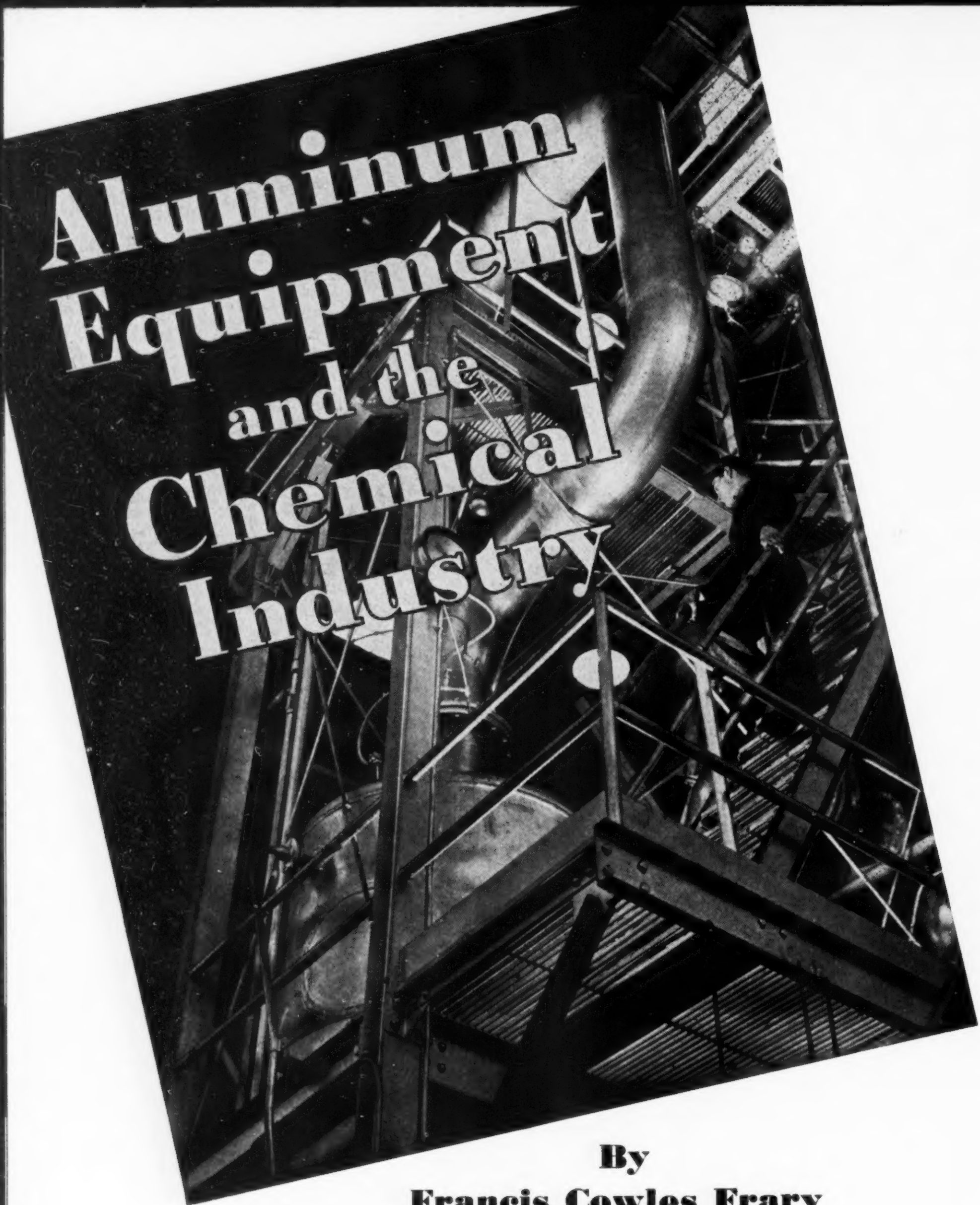
PLANT OPERATION AND MANAGEMENT

Recent Installation of Houdry Cases

This striking exterior view shows a Houdry Catalytic Refining plant with emphasis on Houdry cases.

A DIGEST OF NEW METHODS AND EQUIPMENT FOR CHEMICAL MAKERS



Aluminum Equipment and the Chemical Industry

Aluminum Alloys Due to Their Non-Corrosive Qualities Have Been Welcomed into Chemical Plants on an Increasing Scale. Our Author, an Acheson Medalist, Discloses Many Uses to Which It Has Been Put, and Tells Why.

By

Francis Cowles Frary

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This paper was prepared for presentation at Berlin Chemical Engineering Congress, now definitely postponed. It was presented by title at Buffalo meeting of the American Institute of Chemical Engineers.

BECAUSE of its inherent resistance to corrosion by most chemicals except strong acids and alkalies, and the fact that its compounds are colorless, aluminum has come to be quite extensively used in the chemical industry. Numerous articles in scientific journals and pamphlets issued by the manufacturers of aluminum equipment give adequate information about its behavior in contact with most of the chemicals with which one would desire to use it. The present paper will therefore present the subject from a structural rather than from a chemical point of view.

One of the difficulties involved in the use of pure aluminum for the construction of large chemical equipment is the fact that it has a relatively low tensile strength and yield strength as compared with steel. Since the alloy containing about 1.25 per cent. manganese (called in the United States 3S) has distinctly better physical properties and is just as susceptible to the different mechanical operations and to welding, it is generally used rather than pure metal for the construction of such equipment. Another type of alloy which is coming into use, and which is considerably stronger than pure aluminum, is the one containing about 2 to 3 per cent. magnesium, with or without a small addition of chromium or manganese (such as the alloy called 52S in the United States). Alloys of the magnesium silicide type containing about 1.25 per cent. of magnesium together with enough silicon to approximate the compound Mg_2Si (such as the alloy called 53S in the United States) are still stronger, and seem to be the only alloys which can be used in the heat treated condition in contact with some chemicals and certain food products, such as beer, without difficulties caused by the action of the alloy on the liquid. Heat treated strong alloys of the duralumin type can generally only be used in chemical equipment if they have been provided (at least on the surface in contact with the chemicals) with a protecting layer of pure aluminum or corrosion resistant aluminum alloy. Apparently materials of this type have not yet been extensively used for such purposes except for the fuel tanks of automobiles, trucks and airplanes, although one tank car of this type is in successful service in the United States.

A piece of equipment which is interesting because of its size and unusual engineering specifications (for aluminum equipment) is the bubble tower shown in Fig. 1. This has been in use since June 1938, in a plant engineered by the Semet-Solvay Company, to extract ammonia from by-product coke oven gas. This tower is 37 ft. (11.3 m) high and 8 ft. (2.44 m) in diameter, and was fabricated of 3S "as rolled"* plate. The thickness of the shell is ⅜ in. (9.5 mm) and of the plates ½ in. (12.7 mm) while the bottom is ⅝ in. (15.9 mm) thick. It is operated at an internal positive pressure of 10 pounds per square inch (⅔ atm.) and was tested at twice that pressure. Aluminum was used instead of steel, in order to avoid corrosion from the hot ammo-

Francis C. Frary

* This designates the state in which the metal is produced by hot rolling. It is usually somewhat harder than the annealed material, perhaps about ¼ hard.

niacal sulfide-bearing liquor. The flatness required of the horizontal sheet at the bottom of each section was extreme: when each tower section was filled with water to the level of the top of the weir, the top of each of the machined slots in each bell in a section (Fig. 2) had to be within 1/16 in. (1.6 mm) of the same level, so as to insure uniform distribution of the gas through the different bells. This involved very carefully supporting each plate from below, using 3S structural shapes.

Figure 3 shows the largest aluminum tank erected in the United States. This has been in service since November 1937, holding glacial acetic acid, and has a capacity of 160,000 gals. ($606m^3$). The inside diameter of the tank is 35 ft. (10.67 m) and the height 25 ft. 2 in. (7.63 m). The material used was 3S "as rolled" plate assembled by torch welding and varying in thickness on the sides from 5/16 in. (8 mm) at the top to 9/16 in. (14.3 mm) at the bottom. The tank bottom itself was ¼ in. (6.3 mm) thick, and the top 5/16 in. (8 mm). Many years of experience have shown that such aluminum tanks are extremely satisfactory in this service.

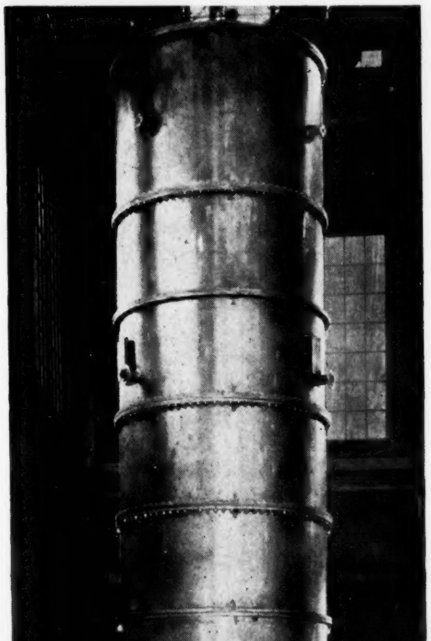


Figure 1.

Bubble tower in use since June, 1937, in plant engineered by Semet-Solvay Company to extract ammonia from by-product coke oven gas.

Figure 4 shows part of an order of 20 water-cooled 3S aluminum condensers having rather unusual features. Used for the purpose of stripping hydrogen sulfide from oil refinery gases, these 16-20 ft. (4.9-6.1 m) long condensers were tested to an internal pressure of 50 atmospheres before shipment.

Aluminum structural shapes may be put to peculiar uses in the chemical industry. Thus, Figure 5 shows channels welded to the outside of a tank to form an external jacket or coil, for steam or cooling water. By this means, any area of a vessel or tank may be heated or cooled from the outside, and at the same time considerably stiffened mechanically.

Straight-sided aluminum drums with steel tires, as shown in Figure 6, are used for certain dangerous commodities. With relatively heavy walls (6.3 mm), they are used for the shipment of strong nitric acid, acetic acid, and formaldehyde; with slightly thinner walls for inflammable liquids having a flash point below 80° F. (27° C.), and with still lighter walls for hydrogen peroxide. The largest drums of this time have a capacity of 110 gals. (416 liters). These drums are made of pure aluminum or 3S alloy.

Figure 7 shows a lighter and much cheaper drum of 55 gals. (208 liters) capacity made of either 3S or 52S (wall thickness 0.08 in.=2 mm), used for materials which are not corrosive or inflammable like the above products. A considerably cheaper type of barrel, which is approved for all liquids except nitric acid, is shown in Figure 8. These are made of the heat treated magnesium silicide type alloy 53S, and will stand an internal pressure of 50 lbs./sq. in. (3⅓ atm.) without any distortion of the head. They are guaranteed to withstand an internal pressure of 250 lbs. per sq. in. (16.7 atm.) before leaks develop. The 30 gal. (114 liters) size weighs only 38 lbs. (17.2 kg.), while the 15 gal. size weighs only 18 lbs. (8.2 kg). A 13-gal. (49 liters) 53S carboy is the most recent innovation to replace glass for the shipment of certain chemicals, and is shown in Fig. 9.

For shipment of larger quantities of liquids, about 180 aluminum tank cars are in service in the United States. These cars have capacities ranging from 6,000 gallons (23 m^3) to 10,000 gallons (38 m^3) each, and are mostly made of riveted 3S or the magnesium silicide type alloy, 51S. There is, however, some trend toward the use of welded tank cars.

A very large installation of tanks and piping for handling distilled water in the plant of the Mallinckrodt Chemical Company has recently been described.* Aluminum piping up to 6 in. in diameter has also been used for the distribution of ordinary softened and purified water in rayon plants, in order to avoid the introduction of any iron rust. This use has been very satisfactory, except where the water was inadvertently contaminated by copper dissolved from a heater which had copper pipes in it. The dissolved copper was precipitated on the aluminum pipe and caused local corrosion.

* H. V. Churchill, Chem. and Met., 46, 226 (1939).

Figure 2.

Each of the machine slots in each bell in a section such as that shown above, had to be within 1-16" of the level of water when bubble tower sections were filled to insure uniform distribution of gas through the different bells.

Cylindrical Tank Design

In connection with the problem of designing cylindrical aluminum tanks to resist external and internal pressure, tanks 20 in. (51 cm) in diameter have been tested to failure under external and internal pressure, and tanks 42 in. (107 cm) in diameter were tested to failure under internal pressure, in Aluminum Research Laboratories. It was found that the highest stresses produced in the vessel under internal pressure were the circumferential compressive stresses at the knuckle, where the spherical portion of the head meets the cylindrical sidewall. At low pressures, these were six times as great as the circumferential tensile stresses in the sidewall. At higher pressures, however, the vessels deformed slightly and relieved these high stresses to such an extent that the final failure always occurred in the cylindrical portion of the tank.

For cylindrical tanks with heads having substantially the same thickness as the walls, the most balanced design has been found when the spherical radius of the head is equal to the diameter of the cylinder. At the same time, the knuckle radius should be not less than one-tenth of the spherical radius of the head, in order to prevent deformation at the knuckles at pressures lower than those producing yielding in the side walls.

Figure 3.

Largest aluminum tank in the United States. In service since Nov. 1937, it holds glacial acetic acid, having a capacity of 160,000 gallons.

Figure 4.

Part of an order of 20 water-cooled aluminum condensers, used for stripping hydrogen sulfide from oil refinery gases. They are 16-20 feet long.

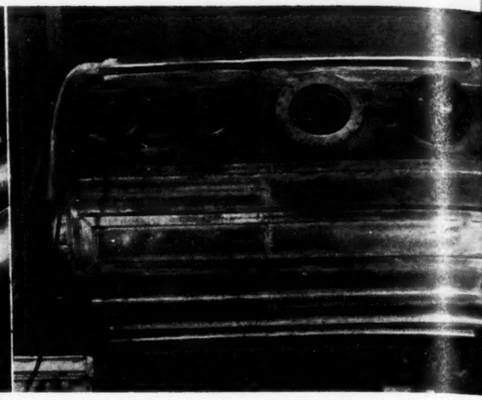


Figure 5.

Channels welded to outside of a tank to form external jacket or coil for steam or cooling water. By this means, any area or vessel of tank may be cooled from outside.

The chemical engineer is sometimes faced with the problem of designing aluminum equipment for operation at elevated temperatures. It is well known that the strength of aluminum decreases as the temperature is raised, but the decrease is not the same in the different alloys or in different tempers of the same alloy. Figures 10 and 11 show the tensile strength and yield strength (stress which will produce 0.2 per cent. permanent deformation on a 2 in. gauge length) of annealed and hard pure aluminum (2S), 3S and 52S sheet. The distinct advantage of using 52S when possible for work at elevated temperatures is clearly shown by these curves. They show the strength of the material at the temperature in question, after it has been held at that temperature for a long enough time (up to many months in some cases) so that the tensile strength and yield strength have stopped decreasing. The peculiar behavior of the aluminum-manganese alloy (3S) in retaining part of the increased strength of the hard temper at temperatures up to about 300° C., while the others lose all such extra strength below 250° C., may sometimes be advantageously employed. Generally, however, the fact that the material will be completely annealed at the welds must be considered.

A good example of the utilization of the higher strength of 52S alloy at elevated temperatures is shown in the varnish kettle of Figure 12. In order to get adequate strength at the bottom, where the kettle is exposed to the fire, it has often been customary to make such kettles with copper bottoms and aluminum sides. By the use of 52S alloy, the kettle may be made of one piece of aluminum, and operates satisfactorily at temperatures of 600-650° F. (315-340° C.). The kettle shown is 34 in. (.86 m) in diameter and 44 in. (1.12 m) high, and has a ¼ in. (6.3 mm) wall and ½ in. (12.7 mm) bottom. From Figure 9 it will be seen that at the temperature in question the tensile strength of 52S alloy is about three times and its yield strength fully twice that of pure aluminum.

Synthetic Resin Kettle

Another example of such a use of 52S is shown in the synthetic resin kettle pictured in Figure 13. This has an internal diameter of 66 in. (1.68 m) and an overall height of 100 in. (2.54 m). It is heated by circulating oil through a jacket in the bottom, and is designed to be op-

Figure 6.

Straight sided aluminum drums with steel tires used for dangerous commodities. With heavy walls they are used to ship strong nitric acid, acetic acid, and formaldehyde.

Figure 7.

A lighter and cheaper drum used in the shipment of materials which are not corrosive or inflammable. It holds 55 gallons and is made of either 3S or 52S alloy.

Figure 8.

Considerably cheaper type drum which is approved for all liquids except nitric acid. They are made of heat treated magnesium silicide type alloy 53S and stand an internal pressure of 50 lbs. per square inch.

erated at 600° F. (315° C.) under full vacuum. Its walls are ⅝ in. (15.9 mm) thick, and the bottom is ¾ in. (19 mm) thick.

Another interesting type of construction is shown in Figure 14. This is a forged cooling or heating plate for use in pasteurizing milk, and is made of the magnesium silicide type alloy, 53S, in the heat treated state. The cooler is made up of two forged pieces placed together and seam-welded (by an electric welder) at the edge. The tubes surrounding the openings shown are inserted by torch welding. These units are assembled in series like a filter press, so that by passing water at the desired temperature through the tubes in the different units the milk flowing past them is first heated and then cooled without contact with the air.

Zinc Plate Protection

Sometimes, in the chemical industry, the chemical to be treated does not corrode aluminum, but the cooling water used in the jacket of the aluminum vessel may do so. In this case, it has been found that the rate of attack can often be greatly reduced by suspending zinc plates in the water adjacent to the aluminum surface and electrically connected thereto. The zinc protects the aluminum and must be replaced from time to time.

In some cases, where zinc plates had thus been used to electrolytically protect structures of iron or other heavy metals, it has been found that they corrode away very rapidly. If the corrosive medium is relatively high in chlorides, sometimes aluminum may be used to replace the zinc in this application, and be found to give a much longer life for the protecting plates. Aluminum plates may similarly be used for the protection of copper or iron vessels in contact with foods, such as milk, where the presence of zinc is undesirable. Copper, for example, gives a metallic taste to milk, but this is prevented by the protective effect of aluminum, which in dissolving does not produce such a taste. Storage in an aluminum vessel or passing a solution through aluminum chips may also be employed to eliminate heavy metals from liquids; as, for example, the removal of lead from maple syrup.

It is, of course, impossible within the limits of a brief paper to cover all of the uses, or even all of the new uses, of aluminum in the chemical industry, but it is hoped that the information presented will be of assistance to chemical engineers in the solution of some of their problems.

Figure 12.
Varnish kettle made of one piece of 52S aluminum alloy.

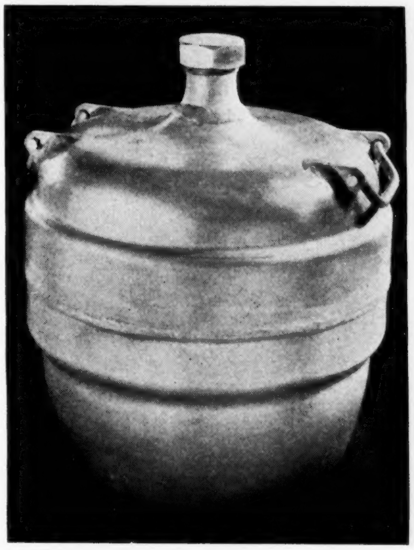


Figure 9.
A thirteen gallon carboy made of 53S aluminum alloy is the most recent innovation to replace glass for shipment of certain chemicals.

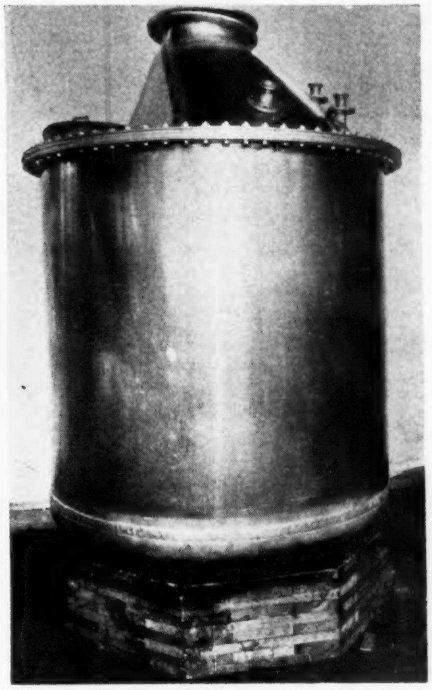


Figure 13.
Synthetic resin kettle of 52S alloy, diameter 66 in., height 100 in.

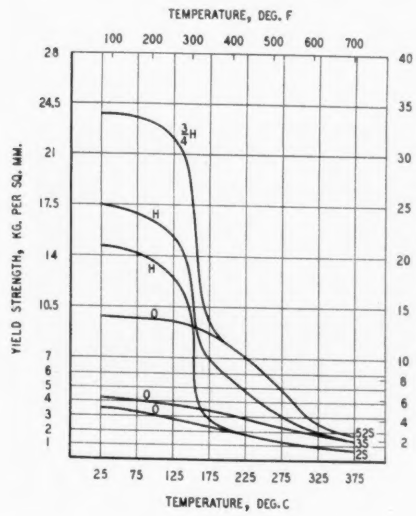


Figure 10.

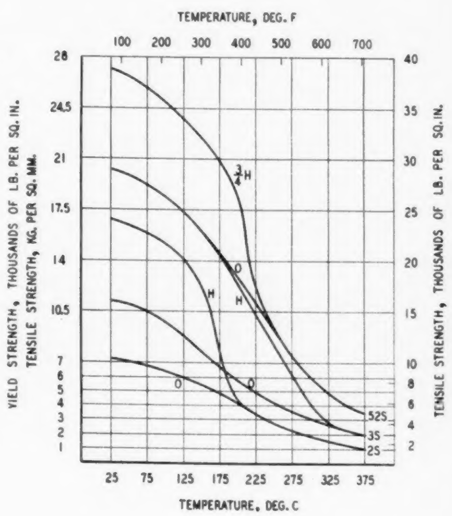


Figure 11.

These graphs show the tensile strength and yield strength (stress which will produce 0.2 per cent. permanent deformation on a 2 in. gauge length) of annealed and hard pure aluminum (2S) 3S and 52S sheet. Curves show the advantage of using 52S alloy when possible for work at elevated temperatures.

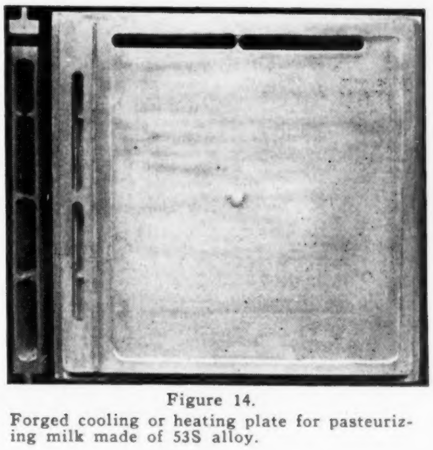
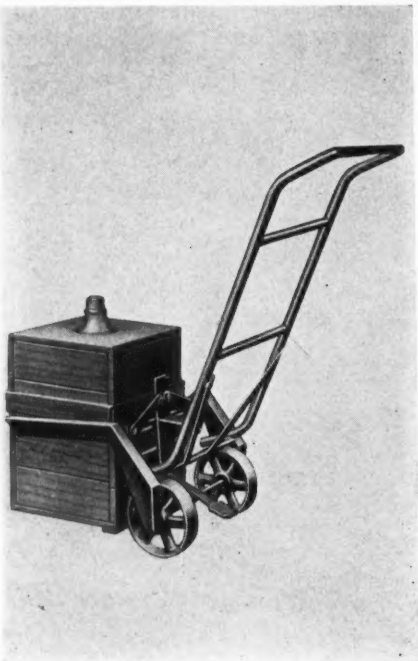


Figure 14.
Forged cooling or heating plate for pasteurizing milk made of 53S alloy.

NEW EQUIPMENT

Carboy Truck

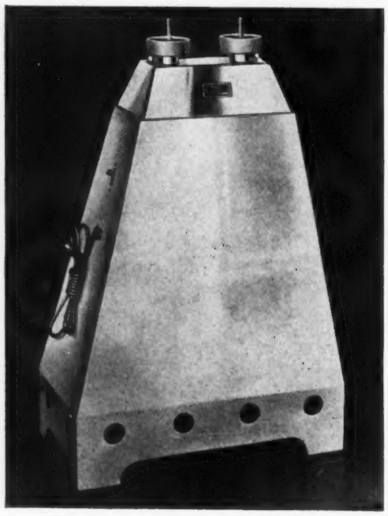
A handy carboy truck minimizes the hazard of transporting carboys, handling them from storage or truck to process faster, safer and easier. These practical units have two arms which are spread open by means of a pedal and close against the crate housing of the carboy when the pedal is released. Welded steel



construction is used throughout with rigidly reinforced tubular steel handles. With this equipment one man can easily and safely handle full or empty carboys.

2-Tube Air Cleaners

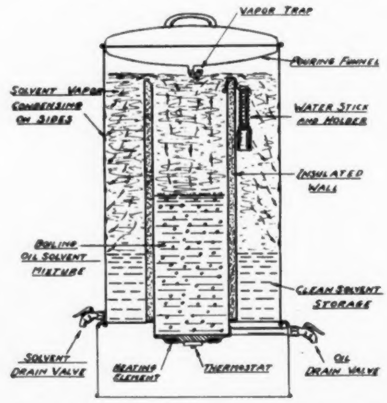
A new piece of equipment called the "E-Z" 2-Tube Air Cleaner has recently been introduced. It was first shown at the Canners' Convention, in Chicago, early



this year. Two containers are cleaned simultaneously, the cleaning tubes and the design of the machine are such that cleaning operations can be carried on continuously without tiring the operator or overworking the machine. The supply of compressed air produced by the compressor, located in the base of the machine, holds the valves in the cleaning mechanism tightly closed and air-tight until the containers are placed over the cleaning tubes. The combined weight of the container, with the help of slight hand pressure exerted on the container bases, depresses the bottle rests, releasing into the container a stream of compressed air. This forceful gust of air, combined with gravity, blows out all dirt, dust, and other foreign matter.

Small Automatic Still

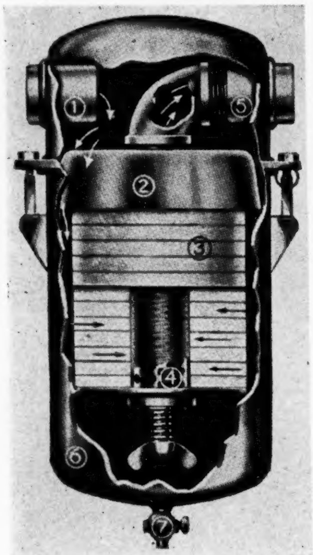
This fully automatic still is used for reclaiming chlorinated hydrocarbon solvents, such as carbon tetrachloride, ethylene dichloride, perchlorethylene, and trichlor-



ethylene. The grease or oil laden solvent is poured into the top of the still. This drains into the inner cylinder container which is insulated from outer container and has its top several inches below top of outer container. The inner container is electrically heated at the bottom. As the mixture is heated, the solvent vapors rise and pass into outer containers, as illustrated in cross-sectional view. As this vapor comes in contact with the wall of the outer container, it is condensed and runs to bottom of outer container where it is stored for further use. The inner container has separate draw-off for oil remaining after distillation. The electric heating element is thermostatically controlled and provided with indicator light to tell when process is completed.

Air Filter

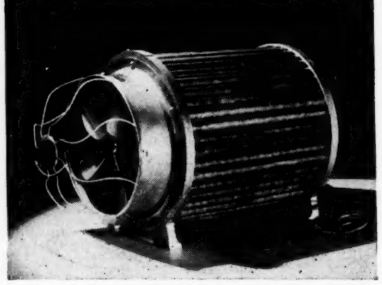
The new "Model AAPHS Protectomotor" air filter, recently announced, is primarily designed for the complete removal of oil from compressed air lines. In addition, it prevents the passage of moisture as well as dust, dirt, pipe scale or other foreign matter commonly found



in pipe lines for air supply. The main feature of the new filter is a series of discs (see "3" on sectional drawing), possessing a large absorption area plus good filtering efficiency. The lower section of the filter shell is easily removed for inspection by loosening nuts on the swing bolts, "8". Another construction detail to be noted is deflector cup, "2", which precipitates most oil and other foreign matter to the sides of the shell by centrifugal force.

Odor Absorber

A newly invented portable "Odor Adsorber," employing the principle of the ordinary gas mask, is now available for removing unpleasant odors, gases, vapors, smoke and fumes from theatres, restaurants, offices, factories, hospitals, lavatories and other places of human occu-



pancy. The device, known as the Dorex "Squirrel Cage Odor Adsorber," is simple, compact, and has but one moving part—the electric motor which draws the foul air in and delivers the purified air to the room after the odorous impurities have been removed.

NEW CHEMICALS FOR INDUSTRY

Dr. K. H. Kingdon and Dr. H. C. Pollock, of General Electric research laboratory, using a mass spectrometer of their own construction, have isolated a tiny quantity of rare form of uranium known as "U-235". They declare it may some day be possible to take from such material several million times the energy to be obtained from burning an equal weight of coal. However, only a hundred-millionth of a gram has been isolated, due to difficulty of separating substance from more common form. Dr. Pollock is holding a tiny electric oven used in the work.

Digest of Chemical Developments in Converting and Processing Fields


Photograph by Kimball.

Dr. Gustav Egloff, Director of Research, Universal Oil Products Company, Received the Medal Award of the American Institute of Chemists at Atlantic City on May 18. In His Address of Acceptance, He Traced the History of the Petroleum Industry and Made Some Predictions Regarding Its Future. We Believe You Will Find Them Highly Interesting.

PETROLEUM Research Steadily Broadens Horizon of Oil Industry

CRUDE petroleums range from almost pure gasoline to solid asphalt as produced in the oil fields of the world. They have odors ranging from the rose and musk to a vileness greater than the skunk. Their colors when viewed in transmitted light vary from cherry, amber, yellow, green, and reddish-brown to dense black, and under reflected light some crudes are highly fluorescent. Crude oils are composed of paraffinic, olefinic, naphthenic, and aromatic hydrocarbons. Many crudes contain sulfur in combination with the hydrocarbons—in amounts from traces to more than six per cent.—while nitrogen and oxygen varies from 0.1 to more than one per cent. Traces of metals such as platinum, gold, silver, uranium, vanadium, and titanium have been found in some crude oils. A few Rumanian crude oils are highly radioactive.

Crude oils are literally a wonder source of substances that are the foundation stone of a number of industries with many more to come. Their effect ramifies throughout our social and economic life and they will be a controlling factor in ultimate victory in a world aflame.

A forward looking group of executives, chemists, physicists, engineers, and a host of other professions have made the oil industry what it is—a $14,000,000,000 organization in the United States. An amazing amount of research is going on in every branch of the industry at an expenditure of over $100,000,000 a year in order to discover and transport crude oil to refining centers for conversion into products useful to man.

The oil industry is doing everything possible to locate and conserve crude oil by calling upon the best scientific and technical knowledge available. Enormous savings have been brought about by the use of geophysics and chemistry, and deeper and directionalized drilling. The Pacific Ocean bed has been drilled from the shore and oil produced. Some lakes in Louisiana and the Gulf of Mexico yield large quantities of crude.

Many of the 360,000 oil wells in operation in the United States were drilled in recent years, but substantial production still comes from wells brought in more than fifty years ago in the original oil state, Pennsylvania. Continued production from these old wells has been brought about by improved methods of oil recovery by so-called re-pressuring. Water is injected through auxiliary wells surrounding the oil well in order to build a hydrostatic pressure in the oil sand. This water flooding process has increased oil production in the famous Bradford field which was discovered in 1875. Production in this field dropped to its lowest point in 1900, when it was considered almost exhausted. Since then, by the use of water flooding, production has been increased eleven-fold above that of the low.

"Water-flooding, scientifically controlled so that no damage is caused in the oil formation, is one of several secondary recovery methods developed by the oil industry to increase production from oil sands which apparently are depleted. This method recently was legalized in Ohio, and already has been introduced successfully in one of that state's older fields. Gas injection, and air injection, similarly designed to build up pressures in underground oil formations and increase recovery, also have made startling advances in recent years."

As the bit bites its way toward the nether regions, water layers or heaving shales are encountered which are sealed off by chemical means. To control oil well pressures, some above 2,000 pounds, and to prevent the well from blowing out, hurtling the tools, casings, etc., a thousand feet or so in the air, counteracting columns of colloidal muds are used, which allow the well to produce oil quietly under controlled pressure due to the weight of the mud-counter to the oil well pressure.

Some years ago in Texas a huge well came in, ripping a crater into the earth and resulting in a terrific fire. There were no methods known of fighting this type of fire. For years the oil industry had been cursed by drilling crooked holes which was inevitable at that period. At times these holes ran parallel to the ground and in some instances actually made a U-bend with the other end of the pipe coming up about a thousand feet from the derrick floor. One of the engineers suggested purposely drilling a slanting hole so that the bit would enter the oil sand. Water was then pumped into the sand, shutting off the fire.

This directionalized drilling was highly successful. Wells may now be drilled in any direction, by a number of ingenious physical and chemical methods. As many as eight wells have been drilled from a single derrick floor in different directions and levels to study the geology and composition of the earth. The deepest well drilled so far is about three miles. It is certain that wells will be drilled and oil found at depths of five miles or more.

In 1860, one year after the Drake well was brought in at a 69-foot level, an oil shortage was predicted as the prevailing rate of oil consumption would exhaust the supply in a few years. This prediction has been reiterated at about five-year intervals ever since. In 1860 the United States crude oil production was 500,000 barrels and 1,250,000,000 barrels in 1939. Moreover, crude oil reserves of today in the known oil fields are about 20,000,000 barrels. During last year alone,

approximately 2,000,000,000 barrels of crude were added to our oil reserves above that actually used. Through the years crude oil reserves have been increasing by finding new oil fields, by deeper drilling in oil fields, and by hydrochloric acid treatment, called acidizing, of old and new oil sands.

One of the greatest forces for conservation and well being of our social and economic life is the cracking process developed by chemists and engineers of the oil industry. This process has more than doubled the yield of motor fuel from a barrel of oil with anti-knock quality which gives over 40 per cent. more miles per gallon than Nature's gasoline. Since 1913 when the first commercial cracking plant was used to the present time, a saving of over 13,000,000,000 barrels of crude oil has been brought about. Last year alone, 1,400,000,000 barrels of crude oil were conserved by the use of the cracking units in the United States which cost $450,000,000. In short, the oil industry would have had to refine 2,638,000,000 barrels of crude to produce the volume of gasoline necessary to operate the 31,000,000 cars instead of the 1,238,000,000 barrels actually refined.

Oil an Irreplaceable Asset?

There is an ever recurrent cry that crude oil is an irreplaceable asset. However, there is evidence to contradict this view. I believe that petroleum is being formed in the earth at a greater rate than we are consuming it.

The theory of continual petroleum formation is supported by the fact that oceans, lakes, and rivers of today abound with fish and mollusks closely resembling those found in many petroleum-bearing formations. Microscopic creatures, such as foraminifera, radiolaria, and diatoms, are present which are identical in body structure with fossils found in the Monterey shale and other oil producing structures, notably in the Lomoc and Santa Maria fields of California.

Such diatoms, scooped alive from the ocean today, yield about two per cent. of oil by ether extraction, although they contain about sixteen per cent. organic material. The possibility that this oil yield may be greatly increased under the temperature, time, and pressure conditions prevailing in the earth, has been considered. It is also likely that some substances such as the silica body structure of the microscopic corpses in the earth exert a catalytic influence which would accelerate oil formation.

Yielding two per cent. of oil, the diatoms in the Monterey shale (which constitutes a bed 800 square miles in extent and half a mile thick in one section of California) would produce two billion barrels of oil. Present-day sedimentation of organic matter is occurring in closed basins of the Continental shelf particularly along the western coast of California. In other oceans and in the deeper waters along the coast, diatoms are depositing with organic content constantly increasing.

Nature Now Producing Oil

From the foregoing we may conclude that Nature is producing oil at a faster rate than gas pressure or pump strokes can bring it to the earth's surface. As a matter of interest, since the foundation of the oil industry, the entire world's production of crude oil would not fill a hole a cubic mile in the earth. This is an insignificant volume compared to what Nature must have produced and still is producing during the years of her workmanship.

In view of the increasing volumes of crude oil reserves, the probability of continuous crude oil formation, better utilization of crude oil and its products, and considering the trifling volume of petroleum used to date, one can look with assurance as to the future oil supplies for our every need for thousands of years.

Gasoline distilled at atmospheric pressure from crude oil does not contain the hydrocarbon molecules of the type most useful to man. Some gasolines which Nature produced have octane ratings as low as 15, and are worthless as motor fuels in modern cars due to high knocking characteristics. The crude oils and their gasoline content have to be converted into more useful products by thermal or catalytic cracking, polymerization, alkylation, aromatization, hydrogenation, and dehydrogenation.

The primary function of cracking is to produce high anti-knock gasoline. As a by-product of this operation, the oil industry has developed motor fuels of 100 and higher octane ratings which make possible greater motor efficiencies whether in airplane or motor car engines.

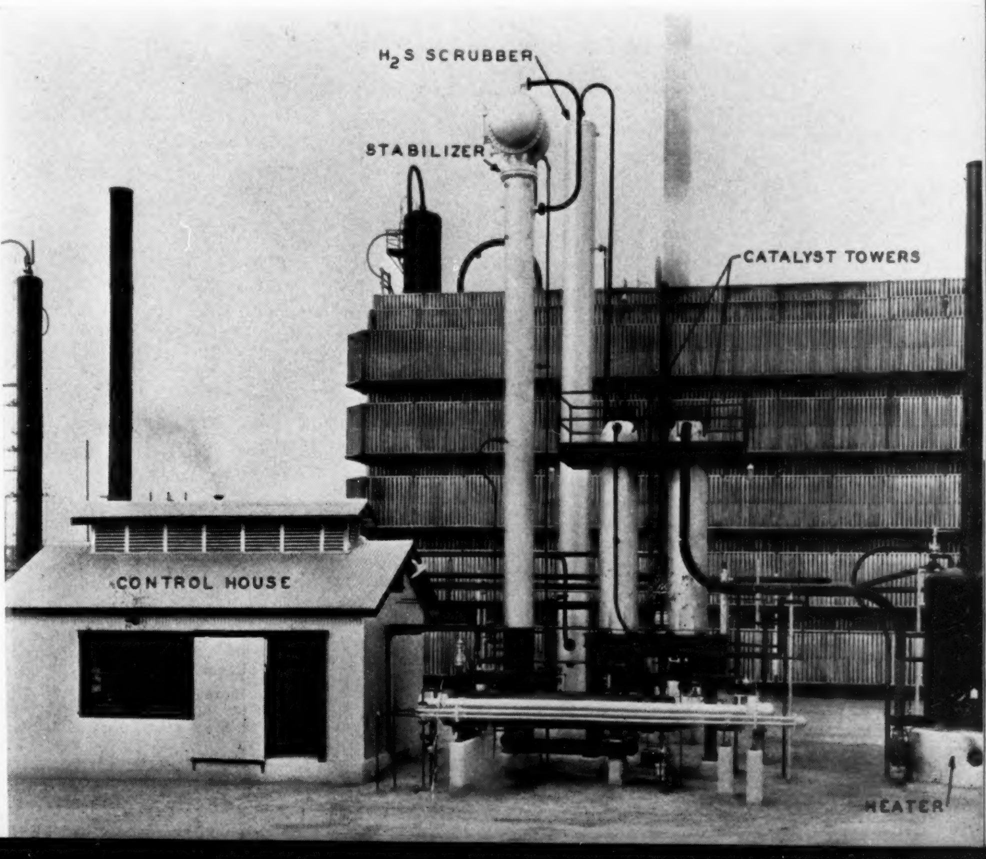
The automobile industry during its early years gave indications of exceeding the capacity of the oil industry to supply gasoline. This thought spurred technical men to invent means for increasing the yield of gasoline from crude oil. The cracking process not alone provided the means for more than doubling the yield of gasoline, i.e., 21 per cent. to 45 per cent. of the crude oil, but in addition improved the anti-knock properties of the gasoline.

In the past twenty years the number of motor vehicles has increased from about 9,000,000 to more than 31,000,000, while the motor fuel consumption increased annually from 109,000,000 barrels to over 566,000,000 barrels. In addition, the average motor compression ratio increased from 4 to 6.4. This is of tremendous significance from an economic standpoint in that motor efficiencies have increased more than 40 per cent. during this period.

Transportation speeds in the air and on the road have more than doubled which is primarily due to the correspondingly improved anti-knock value of the gasoline and better motor design. Pursuit planes of our Army and Navy powered by 100 octane fuel have speeds of over 400 miles per hour.

About twenty-seven years ago the first commercial cracking units went into operation at the Standard Oil of Indiana Whiting plant, using shell stills having a capacity of about 200 barrels of gas oil per day with a yield of about 30 per cent. Today, a single topping and cracking unit with polymerization of the cracked gases treats more than 30,000

A UOP catalytic polymerization unit to make polymer gasoline from cracked gas.



barrels a day of crude oil with yields of over 70 per cent. of 70 octane gasoline from crude oils derived from East Texas. The cost of such a unit is about $2,000,000, whereas the early shell still costs about $20,000.

Modern cracking installations have been highly flexible since the introduction of multiple heating coils in equiflux furnaces wherein the time, temperature, and pressure conditions may be maintained to a nicety. Two-day runs were the maximum in shell-still operation, whereas the modern installation—composed of heaters, reaction chamber, flash chamber, fractionator, coolers, and stabilizer — operates continuously for months at a time, producing motor fuel, furnace oil, tractor fuel, fuel oil and gas oil, or gasoline, gas and coke.

The early shell stills (1913) used cracking temperatures around 740° F. and 75 p.s.i.; today temperatures ranging from 900 to more than 1,100° F. and more than 1,000 p.s.i. obtain. The yield of gasoline from gas oil was about 30 per cent. with octane rating of 60; today units operating on the same type of gas oil produce more than 70 per cent. of motor fuel with 74 octane rating.

The increasing number of high-compression motors has made straight-run gasoline no longer suitable as fuel. Cracking or reforming of the gasoline is necessary to produce hydrocarbons of structures which possess greater anti-knock properties. In order to convert the knocking gasolines into non-knocking types, it is desirable to subject the gasoline to temperatures of the order of 1,025° F. and 750 p.s.i. This is accomplished by pumping straight-run gasoline through a long heating coil distributed in a furnace, until the temperature and pressure are raised to convert the hydrocarbons into high anti-knock gasoline. Under these drastic temperatures and pressures, there is a molecular rearrangement and change in the stucture of the hydrocarbons from the straight-chain paraffinic type to branched paraffins, olefins, aromatics, and naphthenes. These hydrocarbons burn without detonation in the high-compression motors of today.

It was recognized that thermally cracked gasoline was approaching a limit from the anti-knock quality standpoint. The octane number averaged about 70 as produced from gasoline, naphtha, or heavy oils. Hence, catalytic cracking processes have been developed to increase the octane rating and yields above that of thermal. Catalytic cracked gasoline of 80 octane has been produced from gas oil with yields of 85 per cent. on a recycle basis. Catalytic cracking will be an adjunct to thermal cracking for some time to come. An important part of the catalytic cracking process is the quality of the gas produced, since the percentage of olefins present is generally more than double that of thermal cracked gas.

Gases From Cracking Process

The gases produced from the cracking process amount to over 350,000,000,000 cu. ft. a year. These hydrocarbon gases were burned under stills and boilers. But these gases contained olefins such as ethene, propene, butenes, and the corresponding paraffins—ethane, propane, and butanes. Several processes were developed to convert cracked gases into high octane motor fuel via high temperatures and pressures while the catalytic process using solid phosphoric acid operates at low temperatures and pressures.

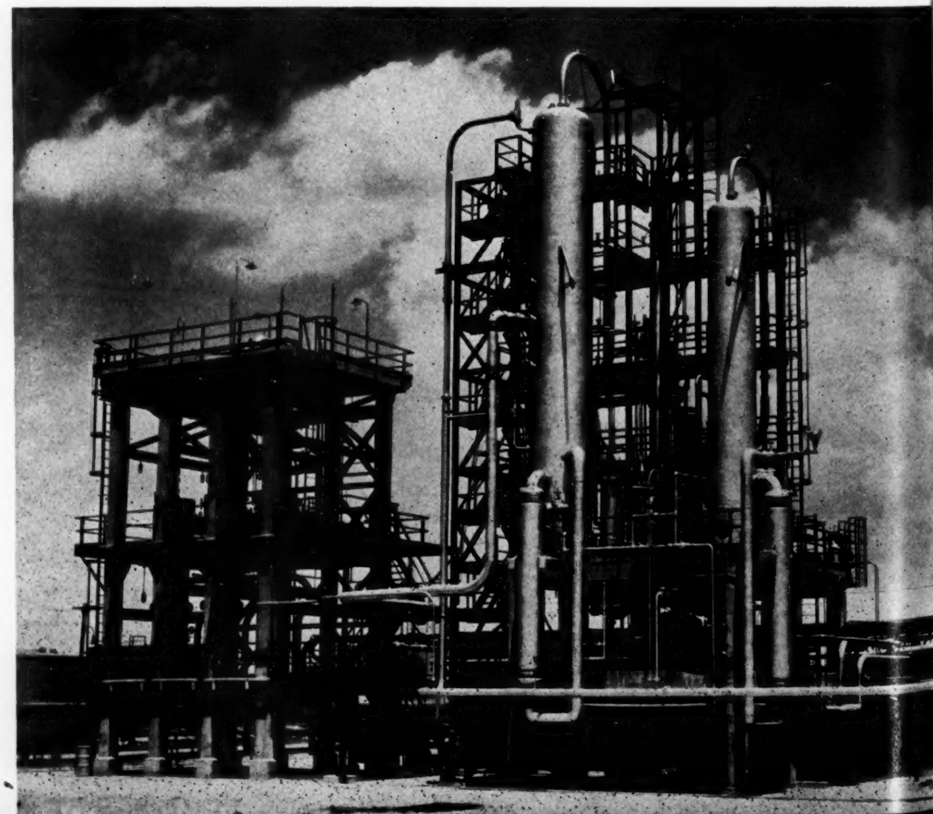
There are over 80 U.O.P. catalytic polymerization units in commercial operation, design, or under course of construction at the present time. The capacities of these units, processing cracked gases range from 125,000 cubic feet to 27,000,000, or on a gasoline (81 octane) production basis, from 18 barrels to over 2,500 barrels daily. The combination of selective catalytic polymerization and hydrogenation units produce from 50 barrels to 800 barrels of isooctane gasoline per day. The increased yield of gasoline ranges from two to eight per cent. with an octane number rise of one to two on the refinery gasoline output when processing naphtha, kerosene, gas oil, or topped crudes.

The butane - butene fractions from either the cracking or dehydrogenation process may be catalytically polymerized to yield isooctenes, and upon hydrogenation, isooctanes of 95 to 100 octane rating. The conditions for the manufacture of isooctane require temperatures of 250° to 350° F. and approximately 750 p.s.i. with solid phosphoric acid as the catalyst. Debutanization and rerunning of the polymers is carried out and finally catalytic hydrogenation with nickel yields an aviation gasoline of 97 octane rating. The potential yearly production of polymer gasoline is over 300,000,000 barrels derivable from refinery and natural gases.

For years it was believed impossible to react a paraffin with an olefin hydrocarbon, due to the so-called unreactiveness of the paraffins. A new page in organic chemistry has been written based upon the alkylation of isobutane with ethylene, propene, and butenes by a number of methods such as aluminum chloride, boron fluoride, sulfuric acid, and at high temperatures and pressures. The latter two processes have gone into commercial use in the past year and are an exceedingly important contribution to high octane aviation gasoline. These two processes produce products having about 95 octane rating and high tetraethyl lead susceptibility. The thermal alkylation process operates best when using charging stocks made up of isobutane and ethene, producing therefrom 2,2-dimethylbutane or neohexane, whereas the sulfuric acid method functions best on isobutane and butenes, forming isooctanes. When all the alkylation units under design and construction, as well as those in operation, are functioning, about 4,000,000 barrels of high anti-knock aviation gasoline will be produced annually.

Military airplanes in 1928 used gasoline of about 60 octane rating while three years later the standard Army aviation gasoline was 87 octane. Airplane engines were developed to utilize this fuel which gave a 33 per cent. increase in power per unit weight compared to 60 octane gasoline. Engines designed for using 100 octane gasoline produced 30 per cent. greater power output compared to 87

An 1,850 barrel UOP selective polymerization unit.



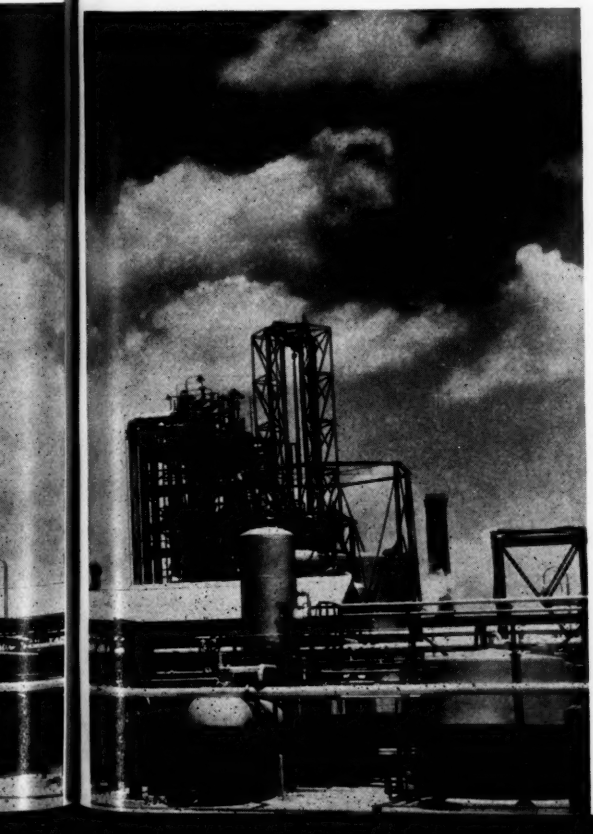
octane, while take-off distances were reduced 20 per cent. and climbing speed increased 40 per cent. For transport planes, the advantage of 100 over 87 octane gasoline in a 1,400 mile flight would be the dispensing of "1,200 lbs. of gasoline and carrying instead 7 more passengers, or their equivalent weight in mail or freight."

Leadership in aviation gasoline, with higher speeds and comfort of airplanes, rests in the United States. Aviation gasoline of 100 and higher octane can be produced in the United States in quantities to supply the airplane needs of the world, for civil and military use.

Although 100 octane gasolines and higher are now used only in airplanes, it will not be many years before the oil industry's researches will produce them at a price level for use in passenger, truck, and bus vehicles, and they will be sharply competitive with the best high-speed Diesel engine performance.

Dr. Graham Edgar stated: "The General Motors Corporation carried out an elaborate research project in which an automobile equipped with a valve-in-head engine was operated at a number of compression ratios and a number of gear ratios, using fuels which in each case were just capable of avoiding knock. Approximately 69 octane fuel was required for the standard 5.25 compression ratio, about 95 octane for 8.0 compression ratio, and something better than 100 octane for 10.3 compression ratio.

"The results were most striking, showing, for example, that at 40 miles per hour the miles per gallon improved from 12.5 at 5.25 compression ratio to 18 at 8.0 and 21 at 10.3. The average increase in economy, between ten and sixty miles per hour, is about 45 per cent. in going from 5.25 to 8.0 compression ratio under these conditions of constant performance."



The volumes of 100 octane gasoline potentially available yearly in the United States are greater than the volume of all gasolines now being produced. One prolific source which has been tapped recently is natural and refinery gases. From these gases alone 8,345,000,000 gallons of 81 octane, or 3,275,000,000 gallons of 92 octane, unleaded, gasolines are available. About 6,000,000,000 gallons of 100 octane aviation gasoline are available yearly when the 92 octane is blended with isopentane and neohexane and light ends from some crudes plus tetraethyl lead. This volume of aviation gasoline does not take into consideration the vast volumes of aviation stock which are potentially available from catalytic reforming and cracking.

The development of catalytic dehydrogenation of gaseous paraffins to olefins and hydrogen has made possible their utilization for polymerization to gasoline and chemical derivatives. Thermal cracking of paraffin gases is a competing source of olefins; however, catalytic dehydrogenation gives a better yield of the desired products than the thermal method. Catalytic dehydrogenation of ethane, propane, and butanes is highly selective in that side reactions are suppressed. Catalysts for dehydrogenation reactions are oxides of the metals of the fourth, fifth, and sixth group of the periodic system, the most important one being chromium oxide and alumina. This catalyst is highly selective and converts the paraffin to the corresponding olefin in about 85 to 95 per cent. of theoretical.

Butane may also be converted into butadiene by a two-stage catalytic dehydrogenation process. This compound is extremely important for use in synthetic rubber production. Butadiene is available potentially in the United States at the rate of more than 160,000,000,000 pounds yearly.

There is a very beautiful reaction called cyclization of paraffin hydrocarbons; i.e., catalytically converting normal hexane, heptane, and octane into benzene, toluene, and xylenes, respectively, with hydrogen as a by-product and almost theoretical yields.

The lower-boiling hydrocarbons in petroleum, particularly those from the Pennsylvania, Mid-Continent, Michigan, East Texas, and Kettleman Hills, California, fields, and gasoline from natural gas, are predominantly straight-chain paraffins. By catalytic cyclization at 932° F. and atmospheric pressure, these hydrocarbons may be converted into the corresponding aromatics which have been obtained heretofore chiefly from coal carbonization.

As of today, the aromatic hydrocarbons are not so good for airplane use, although some tests indicate that they will become useful. They are excellent blending hydrocarbons for increasing the octane rating of gasolines.

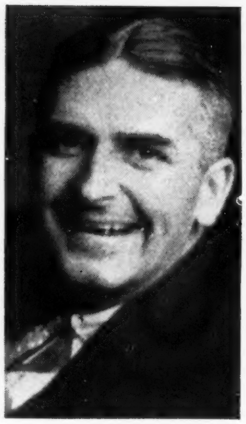
Benzene, toluene, and xylenes are most important for motor fuel use and as basic material for high explosives such as picric acid, T.N.T., and trinitroxylenes. The oil industry can produce any conceivable amount of these hydrocarbons from catalytic cyclization or aromatization of gasoline, the cracking process, and dehydrogenation of ethane. In 1940 about 26,000,000,000 gallons of gasoline will be produced in the United States. If the demand were present, our gasoline output could be increased to over 40,000,000,000 gallons in a short time. Based on this year's gasoline production alone, and using but 20 per cent. of the gasoline, the United States could manufacture (naturally requiring some time to go into full production) about 33,000,000,000 pounds of picric acid, about 27,000,000,000 pounds of T.N.T., and 25,000,000,000 pounds of trinitroxylene. The 85,000,000,000 pounds of high explosives which are potentially available from gasoline are all present within the shores of the United States and for many years to come.

In the world war now going on, difficulty will be experienced in obtaining natural rubber for our own needs. It is reported that the United States has but a three months' supply of natural rubber. Some suggestion has been made to plant rubber trees in a South American country such as Brazil. It would require at least ten years to obtain rubber in this way. Benzene and ethylene through alkylation and dehydrogenation yield styrene, a starting hydrocarbon for synthetic rubber manufacture. Butadiene is another hydrocarbon which can be readily produced and converted into synthetic rubber or may be copolymerized with styrene. This latter type of synthetic rubber has about 30 per cent. greater wear quality and strength in tires than natural rubber. The United States has potentially available enormous quantities of these hydrocarbons and other substances which can be converted into synthetic rubbers. In 1939 about 1,100,000,000 pounds of natural rubber were used in this country. Over 200,000,000,000 pounds of synthetic rubber could be produced from ethylene from the cracking process, benzene from cyclization, and butadiene from the dehydrogenation of butane. A unit to produce 10,000 pounds a day of synthetic rubber from butadiene derived from petroleum is being installed.

The United States is more than self-sustaining in motor fuels and aviation gasoline of 100 octane and above. The United States can produce billions of pounds of explosives for any necessity that may arise and still have more than sufficient gasoline for any form of transportation on land, air, or sea. The United States can also be more than self-sustaining in synthetic rubber from its own vast hydrocarbon resources.

Shipping and Container FORUM

By R W Lahey



TESTING SHIPPING CONTAINERS FOR RESISTANCE TO TRANSMISSION OF WATER VAPOR.

NO more difficult task faces the manufacturers of dry hygroscopic products than to choose containers which will adequately protect such products from the absorption of water or water vapor. Obviously this statement applies more particularly to such bulk containers as bags, slack barrels, kegs, fiber drums, boxes, etc. It is doubtful if any test has been devised which can accurately foretell results under commercial shipping and storage conditions. There are so many factors which must be considered that the only recommendation which can be made at this time is to pack and ship a substantial quantity of the product commercially and observe conditions. This takes into consideration all conditions which can be encountered, such as transportation and handling abuses to containers, storage in humid locations, changing conditions of temperature, humidity, etc.

Two tests to measure the transmission of water vapor through a membrane have been generally accepted. These tests are used to show the comparative permeability of different membranes and in some instances have been used to indicate what might be expected when such membranes are incorporated into the construction of containers. They are as follows:

I. A membrane of the material to be tested is carefully sealed over a cup containing water, such as the Payne Permeability Cup or the Thwing Vapometer. The vapor pressure of the atmosphere surrounding the cup is maintained at a lower level than that in the cup, causing transmission of water vapor out of the cup through the membrane. The loss of water is measured by weighing.

II. In the desiccator test, a membrane is sealed over a cup containing a hygroscopic material. In this case the process is reversed as the vapor pressure in the cup is maintained at a low level by absorption of vapor by the desiccant while the air surrounding the cup is kept at a higher vapor pressure and therefore higher moisture content. The results are measured by increase in weight of the hygroscopic material in the cup.

There have been many investigations made to determine the amount of edge leakage, the correct height of the membrane above the water level, and the proper mechanical means of maintaining the surrounding air at a fixed humidity, etc. These test details, of course, are of utmost importance for accurate results, but the following basic questions must be answered before these tests can be accepted as accurately indicating container performance:

1. Ordinary storage conditions encounter variations from day to day in temperature and humidity. Will these tests outlined above where temperature and humidity are kept constant give results which can be used where conditions are subject to wide variations?

2. A hygroscopic material in a container has the effect of continually lowering the vapor pressure on the inside of the container. In the first test described, a low vapor pressure outside of the membrane is maintained mechanically by air conditioning. We should know if the rate of transmission of water vapor under these different conditions are comparable.

Abuses Not Considered

3. Transportation and handling abuses to the containers may change the impermeability of the container material. It is known that bending, stretching, etc., changes the impermeability of some moisture resisting films and this is not considered in these tests.

4. In the fabrication of containers the materials of construction are frequently bent, folded, glued, sewed, etc. No consideration is given these important conditions.

It must, therefore, be concluded that these tests are of questionable value to container users until these questions are answered. It may be found necessary to change these tests to duplicate commercial container manufacturing and actual handling and transportation conditions.

This makes it necessary for the shipper to prove each new container or container material for himself. It is time that shippers take some joint action to devise, or cause to be prepared, a test for moisture transmission which can be depended upon to foretell results under commercial conditions.

B. F. Goodrich Co. has introduced this specially compounded paste for cleaning white sidewall tires in this metal package with brush applicator.

Royal Dry Cleaner, product of Hecker Products Corp., is offered in two packages, this lithographed tin container, and smaller bottle in carton.

New Du Pont automotive specialty which checks formation of rust in automobile cooling systems.

CHEMICAL SPECIALTIES

Congoleum-Nairn, Inc., largest manufacturer of smooth-surface floor coverings, has developed "Nairn" Self-Polishing Wax for polishing and protecting floor surfaces. Product is made with a base of No. 1 quality Carnauba wax. To apply, it is only necessary to clean and dry old surface. Manufacturer claims that it dries within a few minutes with a brilliant lustre, eliminating polishing operation.

INDUSTRIAL · HOUSEHOLD · AGRICULTURAL

SOAPS and Saponifying Agents

By Benjamin Levitt, F.A.I.C.

Consulting Chemist

With the Introduction of a New Group of Saponifying Agents Many Advantageous Formula Changes Are Possible in the Manufacture of Certain Types of Soap. They Are Here Discussed, With Accent on the Comparatively New Amines.

VAST strides have been made in the technology of saponifying agents, since the early housewives lixiviated potash from wood ashes, for their Spring soapmaking. Until triethanolamine was placed on the market a few years ago the only saponifying agents available for soapmakers, were caustic soda, sodium carbonate, caustic potash, potassium carbonate, (the latter two, until recently almost entirely imported), ammonium hydroxide and ammonium carbonate.

The chemicals mentioned are highly alkaline stable materials, with the exception of ammonia which is more or less volatile, even in the combined state as ammonium soaps. Solutions of soaps made with any of these alkalies, have a pH strength of over 10, while those soaps made with organic amines, show a lower pH.

Saponification takes place in molecular proportions, as does any other chemical reaction. For illustration, suppose we consider the saponification of beef tallow, which we all know to consist chiefly of glyceryl stearate. The reaction may be represented as follows:

$$\begin{array}{cccccccc} C_{17}H_{35}COOCH_2 & & NaOH & & C_{17}H_{35}COONa & & CH_2OH \\ | & & & & | & & | \\ C_{17}H_{35}COOCH & + & NaOH & \rightarrow & C_{17}H_{35}COONa & + & CHOH \\ | & & & & | & & | \\ C_{17}H_{35}COOCH_2 & & NaOH & & C_{17}H_{35}COONa & & CH_2OH \\ \text{Glyceryl Stearate} & & \text{Caustic Soda} & & \text{Sodium Stearate} & & \text{Glycerin} \\ \text{Mol. Wt. 890} & & \mathbf{120} & & & & \end{array}$$

In other words, the molecule of tallow (glyceryl stearate), which has a molecular weight of 890, combines with three molecules of NaOH which have a combined molecular weight of 120, in the proportion of 890: 120. Therefore, to saponify 100 pounds of tallow, about 14 pounds of caustic soda would be necessary. Practical soapmaking bears this out.

Similarly, if the saponification were carried out with caustic potash, the ratio would be 890 :168 or to saponify 100 pounds of tallow, about 19 pounds of 100 per cent. potash would be required.

Fats and oils consisting of the different fatty glycerides, have different combining weights or saponification values, as the soapmakers call them. Chemical handbooks may be consulted for these values. It should be added, that the combining weights are the same, no matter whether the saponification is carried out by the cold, semi-boiled or whole boiled process.

Soda Soaps

In concentrated form, the soda soaps are hard (*Sapo Durus* U.S.P.), and form the basis of most of the laundry and textile soap chips, powders and detergents. Other properties depend to some extent on the fats with which the soda is combined, and to a goodly extent on other added products, such as alkalies, abrasives and so on, which constitute the "filler," if and when used.

Caustic soda may be used to saponify neutral fats and oils (glycerides), while carbonate of soda will chemically react only with the fatty acids (deglycerinated fats and oils). Saponification with sodium carbonate is cheaper, but it is used only in special cases. In large scale soapmaking, rosin is so saponified, but owing to the great evolution of carbon dioxide, and consequent spattering and rise of the soap in the kettle, saponification with carbonates, is avoided in many soap plants.

Potash Soaps

The potash soaps have the general characterization of being soft or quite plastic (*Sapo Mollis* U.S.P.). They are easily dissolved in water, and with the exception of castor oil soap, these soaps give good lather. They find use in wool scouring, base for shampoo, floor scrubbing, carpet cleaning, disinfectants, shaving soap and cream and in other cosmetics. The potash oil soaps range from translucent to transparent in appearance. The actual color of course depends on the oil or fat used. Stearate soaps are pearly.

Ammonia Soaps

Most of the ammonia soaps are soft. They are used as cleaning compounds, in metal polish, in dry cleaning soaps and as emulsifiers. They are not quite as stable as the soaps made with caustic soda and potash. Ammonia soaps are formed by reaction with various fatty acids. Neutral oils do not readily saponify with ammonia.

The volatility of ammonia is of distinct value in some cases, where it is used to saponify a resin such as shellac. A case in point will illustrate this. Its use in the manufacture of no-rub floor wax, where ammonia is used to saponify and disburse the shellac. Upon drying and consequent volatilization of the ammonia, the hardness and luster of the

Workers are shown here washing rayon in a dye and print works.

Photographs accompanying this article furnished by Colgate-Palmolive-Peet Company.

original shellac is restored, giving water repellancy to the product.

Triethanolamine Soaps

In recent years a number of organic chemicals have appeared on the market, which in special cases may be used to replace the older alkalies. First place among these, is held by triethanolamine $(CH_2CH_2OH)_3N$. According to its producers, this consists of a mixture of mono, di and triethanolamine. It is a colorless, viscous, hygroscopic liquid, which combines with fatty acids, in the proportion of 2 parts of fatty acid (oleic) to 1 part of triethanolamine, to form neutral soaps, with lower pH than those of soda and potash. These are powerful emulsifiers which are used for polishes, textile specialties, leather compounds, insecticides, cutting oils, and water paints. The ethanolamines furthermore, make good solvents or disbursing agents for such organic substances as shellac, casein and rubber.

One of the most important properties of triethanolamine soaps and which is not possessed by ordinary potash and soda soap, is that the amino soaps are soluble in oil, and hence produce oil in water emulsions.

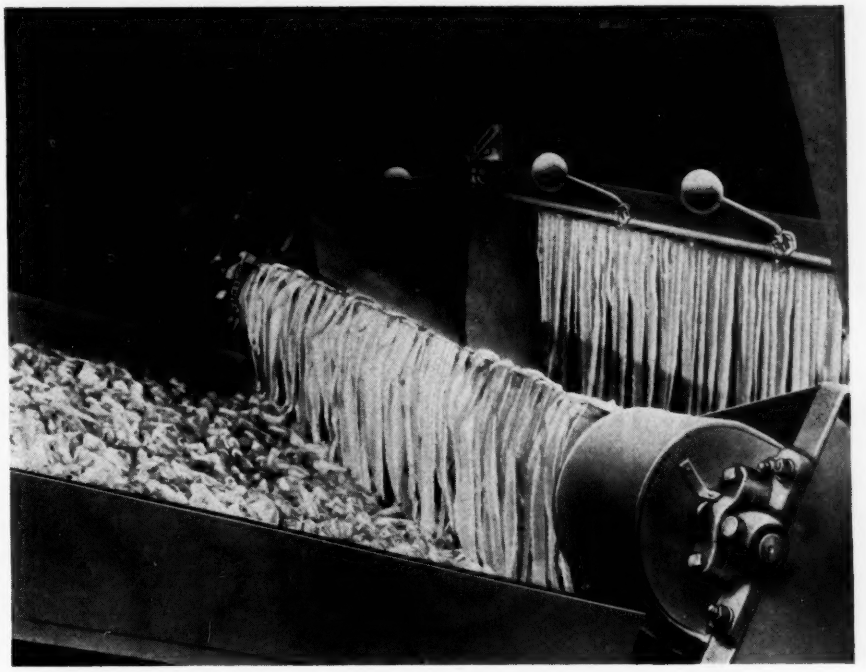
Monoethanolamine oleate has been tried as a medicine for varicose veins. Meyer —*American Journal of Surgery* '40, page 628 found that it is less toxic than sodium morhuate generally used, and that it does not produce allergic reactions.

Here is a typical water in oil emulsion, as suggested by Carbon and Carbide Chemical Corporation: Neatsfoot oil 88 parts, oleic acid 10, triethanolamine 2, water 80. Add together, oleic acid and 30 pounds neatsfoot oil and triethanolamine at room temperature. Mix thoroughly and add 33 pounds of water gradually, stirring vigorously with an electric mixer. Continue stirring, and slowly add the remainder of the oil and the balance of the water. Stir until uniform. This emulsion may be used for leather and silk soaking. Dilution may be made as required.

Ethylene diamine $(H_2NCH_2CH_2NH_2)$ is a colorless water soluble liquid with ammoniacal odor. It has the lowest equivalent weight of any organic amine. Thirty pounds are required to combine with 282 pounds of oleic acid.

In general, it may be said that fatty acid soaps of the amines are valuable for several reasons:—ease of preparation, buffered alkalinity, high emulsifying power and solubility in oil. They are useful in formulation of dry cleaning soaps, soluble oils and cosmetic creams.

Morpholine $[NH(C_2H_4)_2O]$ is a colorless, mobile liquid with a penetrating ammoniacal odor. It is a mild base and forms soaps like other amines. The oleate and stearate are useful in the preparation



Cooling roll of soap dryer. Hot soap from kettle is passed over cooling roll where it is congealed and scraped from roll in thin ribbons. Ribbons then enter drying chamber at approximately 30% moisture.

of stable oil in water emulsions. They are of outstanding value in the formation of coating emulsions, such as in polishes, paper coating, leather dressing, paint, asphalt, sizing and lacquer emulsions, where it is desirable that the resultant film after drying, shall not again emulsify. Upon drying, morpholine volatilizes from the emulsion film, leaving it practically water resistant.

Triisopropanolamine $(CH_3CHOHCH_2)_3N$ is a crystalline pure white solid, melting at 45° C. The manufacturers advise that there is also available a mixture of triisopropanolamines that is liquid. These form stable non-darkening soaps, which are excellent emulsifying agents and are completely soluble in hydrocarbons.

George W. Fiero investigated these soaps, and found that cold creams produced with them were softer than those prepared with triethanolamine, and that they did not discolor with age to the extent found in triethanolamine creams. As for detergency, this investigator found that triisopropanolamine oleate was the least efficient and triethanolamine oleate the most efficient. Anent, detergency of amino soaps, it may be added here, that Fiero—*J. Am. Pharm. Assoc.* 28, pages 284-5 (1939) in a series of washing tests with a miniature washing machine, using pure salts of triethanolamin, found that the laurate, oleate, myristate and palmitate (in the order of decreasing efficiencies) have definite detergent power, but that none were as good as ordinary soap. He also found that the triethanolamine soaps of common mixed fatty acids possessed detergent efficiency in the following order—tallow fatty acids, cocoanut fatty acids, and red oil.

Diethylene triamine $(NH_2CH_2CH_2NHCH_2CH_2NH_2)$ is a hygroscopic viscous liquid, completely soluble in water and hydrocarbons. It is strongly alkaline and forms soaps with fatty acids. Such soaps dehydrate to amides.

Triethylene tetramine $[NH_2(C_2H_4NH)_2C_2H_4NH_2]$ is a viscous water soluble liquid, less volatile than diethylene triamine. It combines with fatty acids to form soaps which are detergents and softening agents.

Monoamylene amine $(C_5H_{11}NH_2)$ is a colorless liquid having a distinct ammoniacal odor, miscible with water and most of the common solvents. It combines readily with fatty acids to form soaps which are soluble in mineral and vegetable oils. Ninety-six parts of this amine are required to saponify 282 parts of oleic acid. It is possible to secure both oil in water and w/o emulsions.

For textile lubrication 3.75 per cent. monoamyl oleate is thoroughly mixed with a 28 Be' paraffin oil, 100 viscosity, and then stirred with an equal amount of water. For hard waters amylamine soaps may be made with cocoanut fatty acids.

A 0.1 per cent. solution of monoamyl oleate has a pH of 9.57.

A suggested use for monoamyl oleate is as a disbursing agent for an insecticide to be used for the control of onion thrips, red spiders, cucumber beetles, tent caterpillars, grape leaf hoppers, types of aphids such as nasturtium, green chrysanthemums, golden glow, rose and green peach. The method of application is as follows: An emulsion is prepared with 5 per cent. triamylamine, 85 per cent. white oil 80-85 viscosity and 10 per cent. monoamylamine oleate. This makes a clear solution, which is then diluted 1:200

or 1:400 with water. It is said not to injure the foliage.

2 Amino-2-methyl-1-propanol, 2 amino-2-methyl-1-propandiol and tris(hydroxymethyl)aminomethane, form soaps which are soluble in both water and oils, and are therefore emulsifiers for oils, fats and waxes and similar materials. They are useful in cosmetics, textile and leather specialties, wax polishes and coatings. The soaps are relatively stable and almost odorless. It is reported that 0.5 per cent. solutions of the oleates show surface tension of 27 dynes per cm.

Guanidine carbonate is an organic alkali of approximately the same strength as sodium carbonate and has the formula $(H_2N.CNH.NH_2)_2H_2CO_3$. The product is soluble in water, but slightly soluble in alcohol and acetone. Advantages ascribed to this chemical over other organic amines are that it is entirely stable under normal conditions. It is a strong base, does not cause yellowing of cosmetic emulsions, and has a combining weight of 90. In combination with stearic acid, mineral oil and waxes it forms stable water in oil emulsions. Investigation of possible toxicity is being made, but the results are not yet available.

In making soaps, the fatty acid should be warmed with an equal volume of alcohol before adding the guanidine carbonate, to prevent due thickening or foaming. These soaps are soluble in alcohols, benzol, carbon tetrachloride ethylene dichloride, naphthas and in water. The properties of such soaps indicate their use as detergents, dry cleaning soaps, general emulsifiers and possibly cosmetics.

The soap industry is a very large consumer of industrial chemicals. The United States Department of Commerce figures show that in 1939 the soap industry consumed 198,000 tons of soda ash and 100,000 tons of caustic soda.

This authority also reports that approximately one half of all the potash produced, is consumed by the soap industry, which in 1935 produced 67.5 million pounds of potash textile soap, 19 million pounds of liquid soap, and 20.5 million pounds of other potash soaps.

In 1937—10,839 tons of potash was produced in U. S., valued $1,437,509.

In 1937—6,081 tons of potash carbonate was produced in U. S., valued $727,730.

Imports: 1,137 tons caustic potash, valued $167,857.

Imports: 788 tons carbonate potash, valued $86,234.

In the past few years imports of both caustic potash and potassium carbonate have been less and less. We are depending more on domestic production.

Total production of all the amines in 1938, with the single exception of triethanolamine (for which figures are not available) amounted to 322,816 pounds. The 228,388 pounds sold were valued at $115,542.

NEW
Processes and Products

Phosphate-Potash Compound

Whatever crops may be concerned, it is always of great advantage if acid phosphate and potash fertilizers are applied to the soil at the same time. Consideration of this advantage has led manufacturers of hyperphosphate to launch a phospho-potash compound with which they appear to render real service to agriculture. For the new compound hyperphosphate is mixed with muriate of potash or with sylvinite. *The Fertilizer, Feeding Stuffs and Farm Supplies Journal,* March 20, 1940.

Spectralite

Messrs. Pilkington Brothers have just announced the introduction of a new plate glass known as "Spectralite" for use in shop windows, show cases, counter guards and interior fittings. As is well known all plate glass has a faint greenish tinge of color, the depth of color being more or less pronounced with different manufacturers, but all tend to spoil true colors seen through them. The idea behind "Spectralite" is to display goods through a glass that has a color-tone in harmony with the goods to be displayed. Two types of this new glass are available. "Spectralite A" is a neutral shade in which all trace of green is eliminated. "Spectralite B" has a slightly deeper tone. *Glass,* March, 1940.

Igelit Products

New forms of the vinylchloride polymerizates produced by the I. G. Farbenindustrie and known as Igelits are constantly being evolved. A recent development takes the form of transparent, colored sheets said to be fast to light and weather. They are being used in the clothing industry for capes, coats, etc. The latest Igelit material is a rechlorinated polyvinylchloride, Igelit PeCe, readily soluble, and from which is spun a fiber called PeCesilk. The fiber is thermoplastic, unaffected by water, has good resistance to acids, alkalies and other corrosive chemicals in any concentration, will not rot, is non-inflammable, highly elastic, and has high heat and electrical-insulating powers. *India Rubber World.*

Fabri-Clean

A new fabric cleaning product called "Fabri-Clean" has been put on the market. It quickly cleans soiled fabrics without leaving spots or traces of the cleaner. This new cleaner, which is non-flammable and odorless, is designed primarily for use in manufacturing plants.

New Ground Coat

A large supplier of ceramic materials announces the development of a new blue ground coat that embodies the following advantages: Remarkably wide firing range; smooth satiny finish without excessive gloss; ideal for thin cover coat applications. This new development in ground coat will not burn off at the edges, and covers even the most difficult shapes with facility. It eliminates blistering caused by defective steel, and has never fish-scaled even under the most stringent of tests.

Coconut Water as Coagulant

The threatened shortage of formic and acetic acids in the far east has led to experiments with several substitutes as coagulants for rubber. The use of both formic and acetic acids are now under Government control. One of the substitutes tried with fair success is coconut water. According to a circular on the subject recently issued by the Rubber Research Institute of Malaya, milk from at least 25 coconuts should be strained and left to ferment for five days. Thereafter, the milk, or water, is ready for use but should be carefully strained before use. For every gallon of diluted latex containing one and one-half pounds dry rubber, 15 fluid ounces of fermented coconut milk are required. *The Rubber Age,* March, 1940.

New Use for Plastacele

"Plastacele," cellulose acetate plastic, has just been introduced in a new line of shelf-edging. This edging is long-wearing, decorative, and easy to keep trim and fresh, for the wiping of a damp cloth across its surface will remove dust and dirt, according to its sponsors.

ALMOST a Century and a Quarter ago, there was built on the banks of Wappingers Creek, at Poughkeepsie, N. Y., a small dyewood grinding mill—one of the earliest steps to make the then Young America independent of foreign sources of supply for its budding textile industry.

This small mill was the beginning of the business that is now Innis, Speiden & Company. Today, thousands of large and small users of Industrial Chemicals, Gums, Waxes and allied lines, all over the country, make us their headquarters of supply for these products.

Our fine modern plant at Niagara Falls, N. Y., meets a large percentage of America's needs in Caustic Potash, Carbonate of Potash, Caustic Soda, Chloride of Lime—and other heavy chemicals.

These products, marketed under the trade name of ISCO, are made to standards nowhere excelled and are backed by a service nowhere bettered.

In another plant, at Jersey City, N. J., are produced good GUMS AND WAXES. For more than 25 years we have made a specialty of these lines, importing the crude and sorting and refining in our own plant, with the benefit of up-to-date equipment and skilled labor.

We can meet any need in Water Soluble GUMS and all kinds of WAXES. You may be sure that here, you will find the product that will serve your purpose efficiently—as well as economically.

ISCO Salesmen are no mere peddlers. They know what they're selling—how it works—and what it's good for. The help they are able to give, when desired, meets constant appreciation from those they serve.

If you are not taking full advantage of the long experience and accumulated knowledge that is back of ISCO Chemicals and ISCO Service—you should be.

INNIS, SPEIDEN & CO. 117-119 LIBERTY STREET, **NEW YORK**

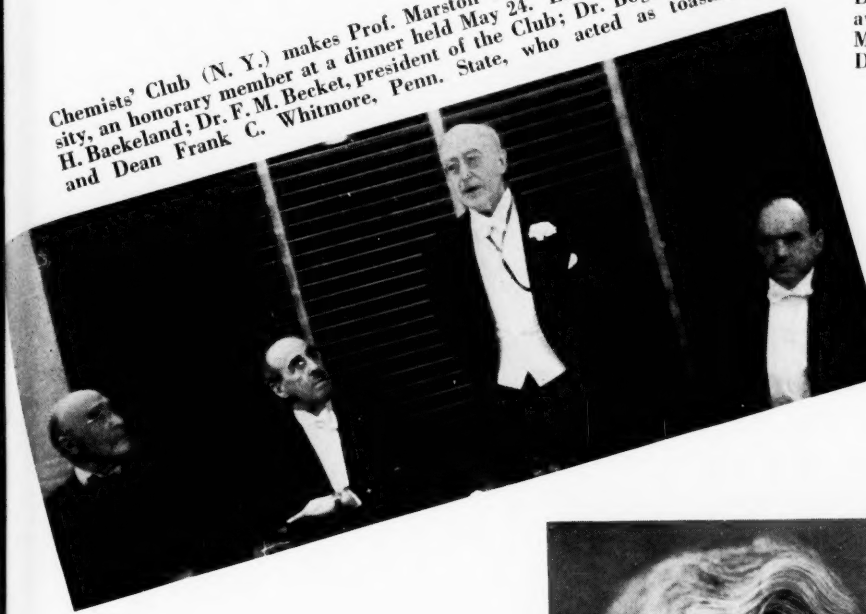
Established 1816

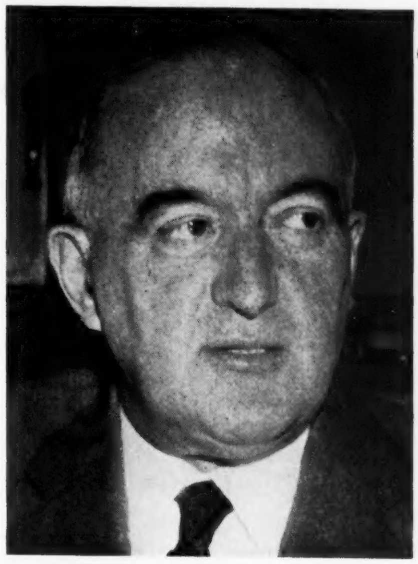
CHICAGO • CLEVELAND • BOSTON • PHILADELPHIA • GLOVERSVILLE, N. Y.

Dr. Vladimir N. Ipatieff, chemical research director, Universal Oil Products, received 1940 Willard Gibbs Medal from Chicago Section, American Chemical Society for industrial chemical discoveries.

Dr. J. Sam Guy (right) received Herty Medal awarded by Georgia State College Chemistry Club. Miss Louise Stanley, club president, is on his left. Dr. James L. Howe, 1937 winner, is second from left.

Chemists' Club (N. Y.) makes Prof. Marston T. Bogert, Columbia University, an honorary member at a dinner held May 24. Left to right: Dr. Leo. H. Baekeland; Dr. F. M. Becket, president of the Club; Dr. Bogert speaking; and Dean Frank C. Whitmore, Penn. State, who acted as toastmaster.

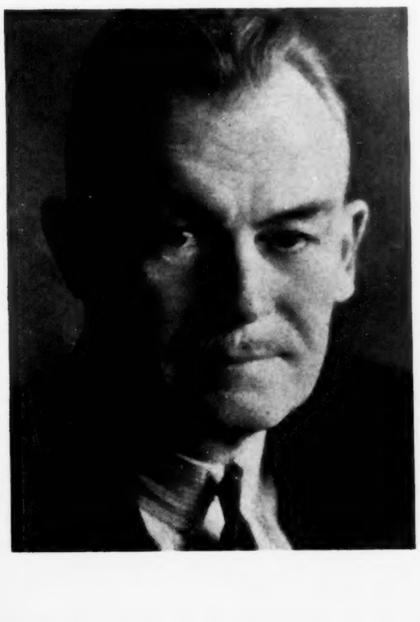




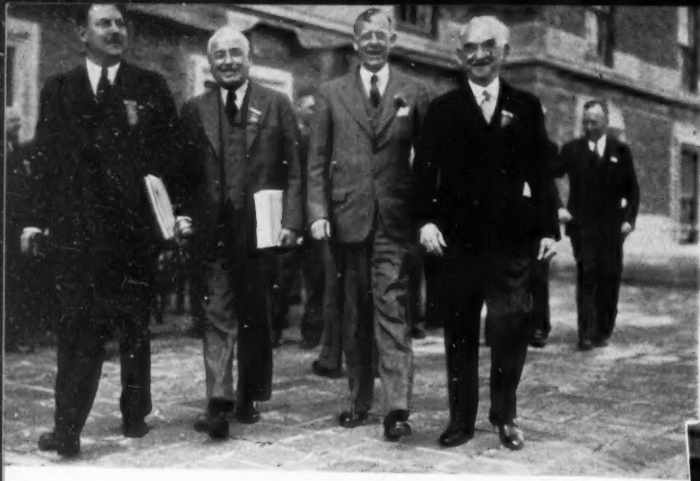
H. S. Wherrett, Pittsburgh Plate Glass president, has been elected president of Columbia Alkali.

Angus B. Echols, Du Pont vice-president, has been elected chairman of the company finance committee.

Clarence F. Brown, new director of sales for Du Pont's Cellophane Division. Oliver F. Benz retired June 1.



N. Y. Chapter of the American Institute of Chemists hear Dr. Benjamin T. Brooks, New York chemical consultant, discuss "Chemical and Political Interests in the Tropical Countries." Left to right: Dr. Brooks; Dr. Harvey G. Lindwall, N. Y. U. chapter head; D. H. Jackson, Croll-Reynolds, secretary.



American Institute of Chemists Convenes at Atlantic City

Left to right: Dr. R. C. Huston, Michigan State College, East Lansing, Mich.; Dr. Gilbert E. Seil, technical director, E. J. Lavino & Co., Philadelphia; Dr. B. S. Hopkins, University of Illinois, Urbana, Ill.; Dr. Hans Z. Lecher and Dr. M. L. Crossley, both of Calco Chemical Division of Cyanamid. Dr. Crossley is Calco's director of research and Dr. Lecher is associate research director.

Above: Dr. Robert J. Moore, development manager, Coatings Division, of Bakelite, and retiring president of the A. I. C.; Dr. Howard S. Neiman, editor "Textile Colorist," and secretary of the Institute; Dr. Harry L. Fisher, in charge of organic research for U. S. Industrial Chemicals, and the new president of the Institute; Dr. Maxmilian Toch, president Toch Brothers.

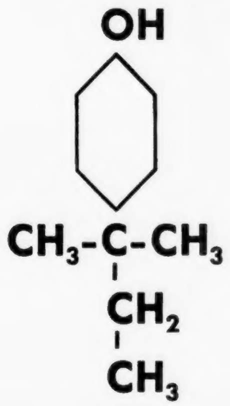
Dr. Joseph W. E. Harrisson, Philadelphia, chemical consultant, and retiring vice-president.

Dr. Robert P. Fischelis, secretary and chief chemist of the New Jersey State Board of Pharmacy, who spoke on "The Status of the Chemist Under the New Food, Drug and Cosmetic Laws."

Left to right: George R. Bancroft, Jefferson Medical College, Philadelphia; Maurice L. Moore, Sharpe & Dohme, Philadelphia; Killary Robinette, W. H. & F. Jordan, Jr., Manufacturing Co., Philadelphia.

PENTAPHEN

PARA TERTIARY AMYL PHENOL



SPECIFICATIONS . . .

CHEMICAL GRADE

Color-Solid	White*
Color-Liquid	Clear Straw
Solubility in 10% KOH	100%
Melting Point:	
Softens	Not below 84°C.
Completely Melted .	Not below 91°C.
Weight per Gallon . .	7.60 lbs.

**May be tinged pink or yellow.*

PROPERTIES . . .

CHEMICAL GRADE

Specific Gravity	0.91-0.94@ 95°C.
Distillation . . .	100% between 250-260°C.
Flash Point (open cup)	232°F.
Heat of Vaporization	89 cal./gm.
Non-volatile Matter	Less than 0.001%

Pentaphen is an important industrial raw material. Its greatest applications are in the manufacture of oil soluble resins and germicides. The presence of the amyl group in Pentaphen imparts a degree of oil solubility not obtainable with phenol or the cresols. The increase in oil solubility is gained at the expense of water solubility. Pentaphen is practically insoluble in water but is soluble in alcohol, ether, benzene and chloroform. It undergoes most of the reactions of a phenol by which high boiling esters, chlorine derivatives and nitro compounds may be prepared. Pentaphen is available commercially in four grades: Crude—Resin—Chemical—Pharmaceutical.

Write for further information or sample of this product.

The SHARPLES SOLVENTS Corp.
PHILA. • CHICAGO • NEW YORK

SHARPLES TRADE MARK SOLVENTS

Left—Wishnick-Tumpeer, Inc., celebrated its twentieth business anniversary at its national sales convention held in Hotel Congress, Chicago. Robert I. Wishnick, president, is seated second from left. Feature of meeting was tour of the company's new research and development laboratory and recently completed asphalt plant.

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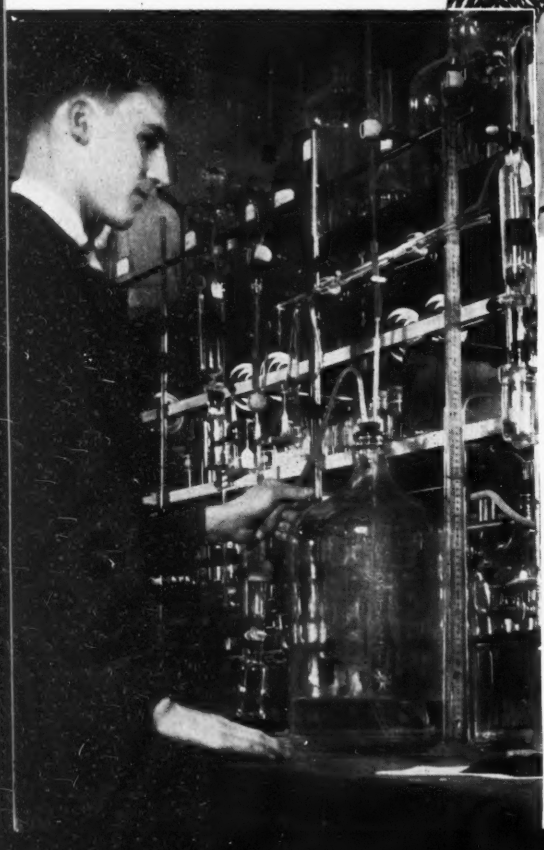
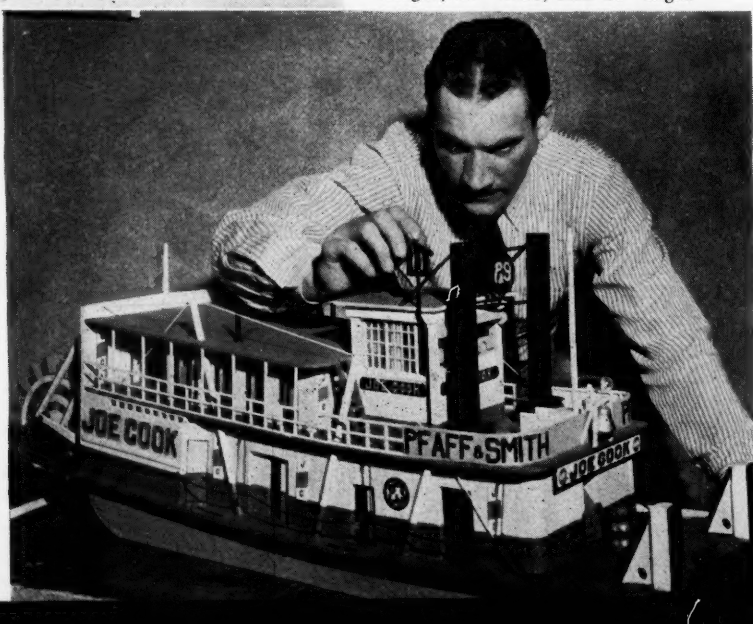
Below—Du Pont's "Wonder World of Chemistry" exhibit at 1940 edition of New York World's Fair includes a new type plastic used to make safety glass. Plastic is characterized by extreme elasticity. Clark Merrick vigorously demonstrates this feature of material for benefit of Mary Sheridan and for the hundreds of editors, feature writers and others who saw the preview on May 10.

Above—Dr. M. D. Leonard, in charge of Pest Control Laboratory at Du Pont World's Fair exhibit explains "rotary seed treater" which checks plant diseases through chemical treatment of seeds.

Below—Resinous Products & Chemical Co., Inc., laboratory apparatus for testing synthetic resins to be used as acid and base exchange compounds under U. S. patents recently acquired from Department of Science and Industrial Research, London.

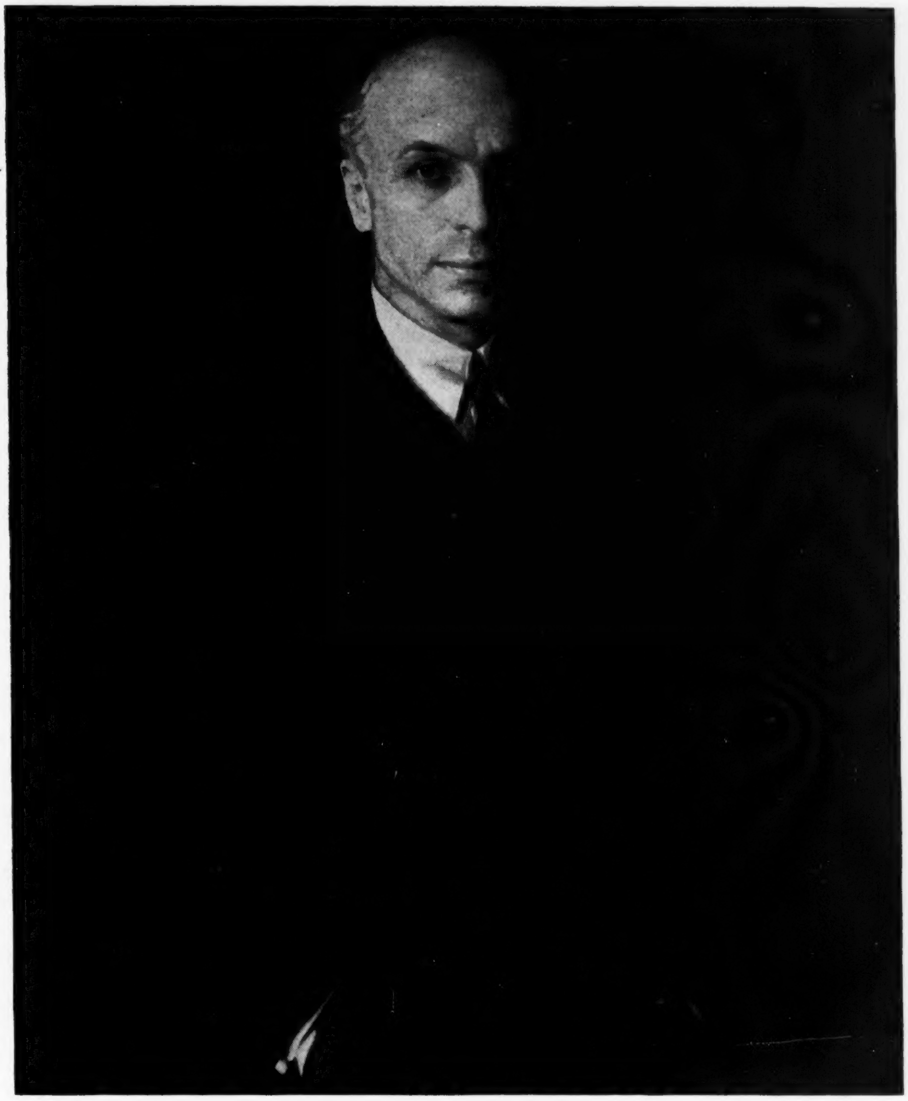


Below—Earl Brady Scott of Carbide's South Charleston, W. Va., construction department used 270 hours of his spare time to construct this replica of a river boat, the original of which now plies the Elk and Kanawha rivers. The model is 5′ 4″ in length, 11″ wide, and 14″ high.



NEWS OF THE MONTH

News Index



New President of Du Pont

Walter S. Carpenter, Jr., was elected president of E. I. du Pont de Nemours & Company succeeding Lammot du Pont who resigned. Mr. Carpenter had been vice-president and chairman of the finance committee. He resigned the latter post and was succeeded by Angus B. Echols, a Du Pont vice-president. Mr. Carpenter is the second individual other than a Du Pont to head the company since it was founded in 1802. Other was Antoine Bidermann, son-in-law of the founder.

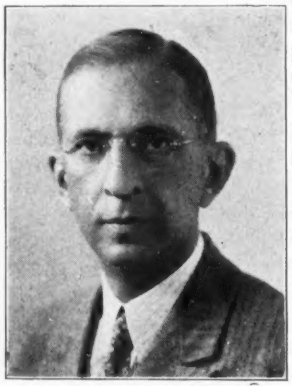
IN REVIEW

CHEMICAL INDUSTRIES

LOSS OF EXPORT MARKET SEEN BY M.C.A. SPEAKER

Record Attendance Marks Meeting At Skytop, Pa.—J. Anton de Haas, Dr. James S. Thomas, Dr. Harold G. Moulton Speak—Officers Re-elected—Purchasing Agents' Cincinnati Meeting Reassured on Chemical Prices—Synthetic Rubber Developments

AMERICAN chemical executives registered a new all-time attendance record at the 68th annual meeting of the Manufacturing Chemists' Association, held at Skytop Lodge, high in the Pocono Mountains of Pennsylvania, on June 6 and 7. Not since the period of the last World War have the leaders of American chemical industry met under more serious and uncertain national and international conditions.



Lammot du Pont

The business session, with Lammot du Pont, president of the M. C. A., presiding, was held Thursday morning, June 6. The report of the treasurer was followed by a detailed résumé of the activities of the association during the past twelve months given by Harry L. Derby, president of American Cyanamid and Chemical, and chairman of the M. C. A. executive committee.

The problems of economic adjustment from the European war were discussed by J. Anton De Haas, Harvard Graduate School of Business Administration, and associate editor of *World Affairs*. According to the speaker, far-reaching readjustments are inevitable no matter which of the present belligerents win on the European battlefields, although if Germany is victorious the repercussions will be greater and more profound. There will be permanent changes in formerly existing international trade relationships.

"The year 1933 marks a mile post in economic history," the speaker pointed out. In seven years the German leaders have fashioned a revolutionary new system, new rules of international trade relationships. They have been highly successful in forcing their viewpoint and practices on most of Europe. They were extending such activities in a major way into Latin America before the outbreak of hostilities and will renew such penetration more deeply with South America and the colonies of the Allies if they succeed in forcing England and France to capitulate.

Even if the Allies are victorious, the United States will find it exceedingly difficult to maintain its share of export trade, according to the speaker. England and France have concentrated their efforts to hold and even to expand export markets into the hands of powerful concentrated groups. International barter is the weapon Germany has employed with signal success and the Allies are utilizing much the same measures. In the face of such competition our system of lassez-faire, open and free trade, will suffer badly.

Suggests Solution

Dr. Haas suggested one partial solution or policy for the United States. He favors closer coordination in our export, import and foreign investment operations. He proposed that our surplus investment funds be directed in larger volume to the development in South America of many of the strategic natural raw materials. In this way, he concluded, we could take back from South America goods instead of gold in exchange for our manufactured products and at the same time assure ourselves of adequate supplies of needed materials without hurting American manufacturing industries.

Dr. James Shelby Thomas, president of Clarkson College of Technology, discussed "Culture in the Market Place." Dr. Thomas indicated that all periods of cultural revival in world history had been financed by industrial activity, that mass production is not new, and suggested "an engineering approach to the abundant life."

Moulton Speaks at Dinner

Dinner speaker was Dr. Harold Glenn Moulton, president of the Brookings Institution, and his subject, "Is Further Capital Expansion Possible?" Dr. Moulton declared that the belief that there will be no great further need for capital expansion in industry from outside sources is fallacious. He pointed out that, despite our gradual decline in the rate of population increase, in the next forty years we may fully expect an increase of between 30 and 50 millions of people. Further, that we must expect to raise the average standard of living by as much as 100 per cent. in that period. Both of these forces, he declared, will inevitably require large sums of outside capital for expansion.

Officers of the M. C. A. were re-elected at the business meeting: Lammot du Pont will again serve as president; George W. Merck and Charles Belknap (Monsanto) continue as vice-presidents; J. W. McLaughlin (Carbide) as treasurer; and Warren N. Watson as secretary.

Two new members of the executive committee are C. S. Horsford, Jr., president of Pennsylvania Coal Products, and T. P. Walker, president of Commercial Solvents.

P.A.'s See No Profiteering

Because of a new spirit in American industry, as exemplified during early months of the present war, there will be no tendency to hijack chemical prices because of unusual demand, J. R. Keach, purchasing agent for Ohio Rubber Company, told the annual convention of the National Association of Purchasing Agents in Cincinnati. Said Mr. Keach:

"As industries continue to be larger users of basic chemicals and as our national defense program gets under way, it is logical to assume the demand for industrial chemicals will continue to increase, the normal result being firmer prices. . . . However, most of us have learned that we are in business to make a reasonable profit by manufacturing, not speculating, and that the best brake against inflation and artificial price situations is a sane middle-of-the-road policy of not scrambling but common sense."

New Synthetic Rubbers

Two milestones in synthetic rubber manufacture were passed last week. Standard Oil announced a new synthetic called "Butyl," which can be supplied to industry in any quantity, while B. F. Goodrich proudly exhibited, at a Waldorf-Astoria press reception, the first automobile tire made from 100 per cent. American materials.

President John L. Collyer, who presided at the reception, gave a brief history of the company's research achievements, then introduced Dr. Waldo Semon, who made a small batch of the synthetic named "Ameripol" on the rostrum. Plant is now being constructed at Akron for commercial production this fall.

"Butyl," Standard Oil's new synthetic, is made through a process more simple and direct than "Buna," which the company also manufactures.

Du Pont Executives Shifted

Walter S. Carpenter was elected president of Du Pont in extensive executive shift last month. Lammot du Pont resigned presidency to become board chairman following retirement of Pierre S. du Pont.

Continued on p. 740

Continued from page 738, Col. 3

Angus B. Echols was made chairman of Du Pont finance committee, a post relinquished by Mr. Carpenter, and J. B. Eliason, treasurer, was elected vice-president and a member of the directorate.

Turner Represents Michigan

Joseph Turner & Co., Ridgefield, N. J., has been named sales agent for products of Michigan Chemical Corp. The Turner Company, which maintains offices in New York, Chicago and Providence, has been acting as selling agents for manufacturers since its inception in 1861.

Michigan Chemical is celebrating its fourth anniversary this month. Ground was broken for a plant in September, 1935, on a plot of ground that had been the city tourist park of St. Louis, Michigan, in the center of the brine beds of that State. Two main buildings, which comprised the original plant, were completed in May, 1936.

Early in 1939, Michigan improved purity of its sodium, potassium, and ammonium bromide through discontinuing the old process of manufacturing bromides from ferric bromide, and began their manufacture directly from hydrobromic acid converted into bromides.

During major portion of the four years of its existence, Michigan Chemical has devoted most of its time in research to improve both physical and chemical properties of its products. Marketing of bromides in pellet form was but one advance in the short but progressive history of the company.

Michigan products now handled by Joseph Turner are: Liquid Bromine, U. S. P. and C. P.; Bromides, such as Potassium, Sodium, Ammonium, Barium, Strontium, Ethyl and Ethylene; Hydrobromic Acid, Calcium-Magnesium Chloride, flake (70-72%), liquid (40%), and Sodium Chloride (Common Salt) U. S. P. and C. P.

Witco Sales Convention

All officers and executives of Wishnick-Tumpeer, Inc., attended national sales convention held last month at Congress Hotel, Chicago. Event took on added significance, since it marked twentieth business anniversary of company.

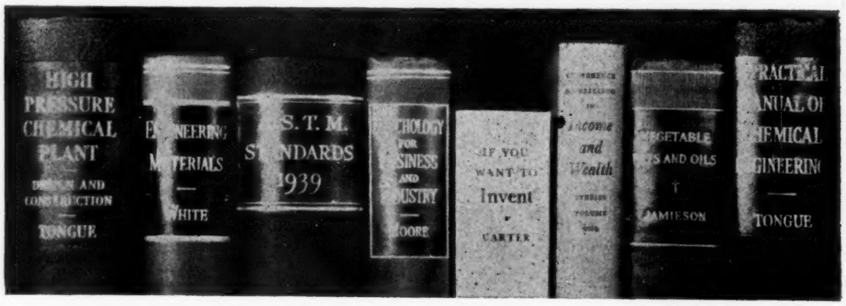
Feature of convention program was tour of company's new research and development laboratory, and the recently completed Witco asphalt plant. Talks by officials stressed the fact that company's products are finding increasing use over a broad industrial front.

Climax Molybdenum Plant

A $60,000 addition to chemical building, Climax Molybdenum Conversion plant is being erected at Langeloth, Pa., according to M. W. Murphy, general manager of the plant. Also underway is construction of a $50,000 warehouse.

Chemist Council Moves

Chemist Advisory Council, Inc., has moved its offices to room 811, 60 East 42d St., New York City, M. R. Bhagwat, secretary, reports.



The Industry's Bookshelf

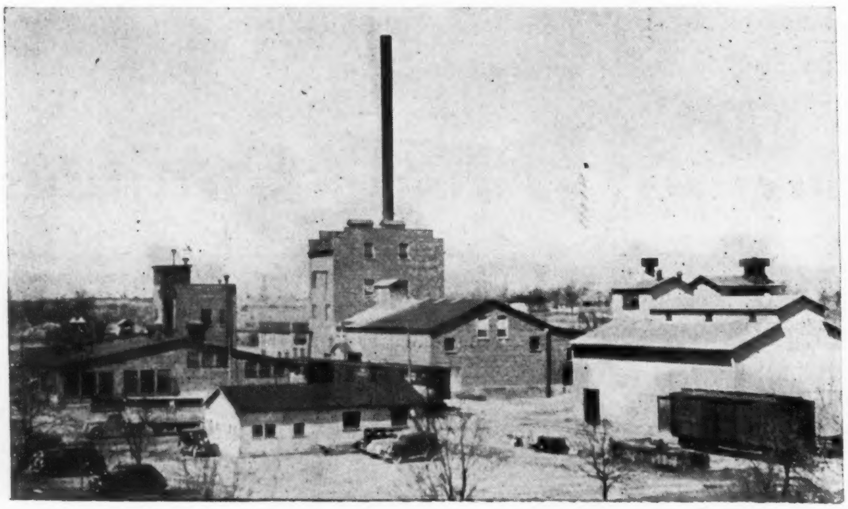
Printing Inks, Their Chemistry and Technology; by Carleton Ellis; Reinhold Publishing Corp., N. Y. City; 560 pages, $7.00. An exhaustive volume, both practical and authoritative, which treats the subject from every angle of interest to ink manufacturers, printers, and chemists. For the manufacturer it discusses ingredients, manufacturing methods, problems of formulation and application. For the printer, lithographer, photoengraver and papermaker it discusses practical ink problems. For the chemist it describes properties of ink ingredients in great detail, and its bibliography opens the door to further literature.

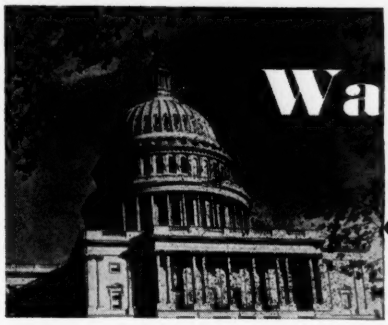
Chemistry of Synthetic Surface Coatings, by Dr. William Krumbhaar, Reinhold Publishing Corp., N. Y. City, 202 pages, $4.00. In this book the important problems of chemical reactions in the varnish kettle and of surface chemistry of pigments and paints are discussed from a fundamental point of view, and in the same way drier chemistry and the physical chemistry of surface coatings are reviewed.

Electronic Structure and Chemical Binding, by Oscar Knefler Rice, McGraw-Hill, N. Y. City, 511 pages, $5.00. A foundation in atomic physics whose general aim is, by discussion and illustration, to give the reader a reasonably accurate idea of the nature of chemical binding in the various types of compound, and to show what can be done toward an understanding in relatively simple terms of the various properties of compounds which are generally described in treatises on inorganic chemistry.

Inorganic Syntheses, Vol. 1, Harold Simmons Booth, Editor-in-Chief, McGraw-Hill, N. Y. City, 197 pages, $3.00. This is the first of a series to furnish chemists and laboratory workers with thoroughly tested methods for the preparation of important inorganic chemicals. It contains about seventy preparations, giving methods of procedure, yields to be expected, and uses and properties of the compounds.

Michigan Chemical Corporation Plant at St. Louis, Mich.





Washington

Russell Kent

PANIC-STRICKEN temporarily by "total war" in Europe and by President Roosevelt's dramatic requests for national defense funds and authority and his solemn warnings, Congress has begun to recover from its hysteria and to regain its poise.

All predictions regarding the date of adjournment and regarding the fate of specific legislative proposals about which forecasts could be made with a reasonable basis for accuracy prior to the middle of May must be revised or discarded.

It appears certain, as this is written, that Congress will provide all the money that is requested by the President—indeed, its disposition is to provide more than he requested—but that brakes will be applied against some of the executive authority that has been asked.

Russell Kent

Politics has not been adjourned, either at the White House and elsewhere in the executive branch of the Government, or in Congress. There is nonpartisan agreement upon the necessity of rearming speedily and extensively, but there are differences as to methods to accomplish this end and there is no evidence that anyone in official life has forgotten that there will be a general election next November.

The political campaign promises to be based mainly upon the question of responsibility for the lack of preparedness which gained recognition in May.

These things appear clear: Not only will Congress appropriate funds liberally, but it will increase the debt limit and levy additional taxes considerably heavier than the comparatively modest percentage supertax to be imposed upon the existing revenue structure which was laid before the Ways and Means Committee as May ended.

The tax program was accepted by the President after it became evident that congressional demand for financing the increasingly heavier appropriations was rising to a clamor. Republican members started this cry; they were joined speedily by some Democrats. Whereas before the middle of May, members of Congress were saying they would be fearful of facing the voters after having enacted legislation for more taxes, by the last week of May they were saying they would be afraid to face the electorate without having levied higher taxes.

President Roosevelt, at a press conference in which he outlined his idea for an additional sum for national defense, said that financing the program was a minor consideration, and he did not mention that subject in his address to the joint session May 16 nor in his "fireside chat" to the nation May 26.

Nor did the President in his address to the joint session mention any plan to implement the rearmament program. It was discovered rather suddenly that the Industrial Mobilization Plan, on which the War Department has been working several years, was practically valueless as to some industries. Congress was left to its own devices on legislation to implement the appropriations, except that several ideas were vetoed by the White House, but worked out a program with admirals and generals.

So far as getting a working plan for production of national defense essentials is concerned, there are some important hinges which still require oiling, but progress is being made.

Defense Council Idea Revived

Re-establishment of the National Defense Council, under the act of Aug. 29, 1916, and the appointment of an Advisory Commission of industrialists, and others, was helpful in clearing the atmosphere. But this Advisory Commission has no legal authority for final decisions; it is charged with investigating and recommending. Inclusion in its membership of Leon Henderson, SEC commissioner, to watch prices of materials, was a strong concession to the New Deal left-wingers, for he has prodded business through the Temporary National Emergency (Monopoly) Committee.

Labor laws are to be relaxed, whether the President likes the idea or not. Mr. Roosevelt told a press conference, and he told the nation in his "fireside chat" that there must be no retreat from the social gains of the last few years; that he hoped hours of labor would not be increased in order that the reservoir of unemployment might be tapped to step up the tempo of production for national defense.

But his generals and admirals had been telling congressional committees that there are bottlenecks in some lines of industry, producing essentials, which are caused by lack of skilled workmen.

So, regardless, Congress began to relax the labor laws. Especially did it strike at the Walsh-Healey government-contracts act, against which the Navy has protested time and again.

In the bill to expedite Navy ship construction, it was provided that contracts may be made by negotiation, rather than by competitive bidding, an authority requested by Navy a year ago, and then denied. The fact is that under a ruling by the comptroller-general, negotiated contracts are not subject to supervision by the Department of Labor; they escape the burden of red tape imposed by elaborate record keeping, and the severe enforcement provisions of that law.

And the 1916 national defense act authorizes the Secretary of War to negotiate contracts for certain—not all—Army supplies and services when in his judgment an emergency exists. New contracts only are excluded from the Walsh-Healey Act.

Forty Hour Work Week

It is provided that time-and-a-half shall be paid as overtime for all work in excess of 40 hours a week. That is basic, as to all these contracts. But the Federal government will take care of this added cost in the contracts. Thus the rearmament program will cost much more than if the original intent in congressional committees to authorize a 48 hour workweek without overtime pay but without reducing the hourly rate of pay had been adopted; a proposal which the President vetoed. To pay for overtime, and extra shifts, on Navy ship construction, it is estimated officially that $350,000,000 will be spent in the accelerated program.

By obscure language in the Navy expediting bill, various other restrictive laws are suspended also; two laws, affecting different classes of workers, fixing eight hours a day as the maximum; the Saturday half-holiday law; the law that civil service employees cannot be dismissed without formal charges and hearings if these be demanded.

This same bill provides, also, that shipbuilders may have the cost of equipment included in the contract, by direction of the Secretary of the Navy. This takes from the Secretary of the Treasury his old authority to determine allowances and determine amortization for shipbuilding, and assures contractors they may know in advance, and afterward, just what is to be allowed. Furthermore, to induce small firms to bid, a 30 per cent. advance may be made before start of the contract, in order to supply capital.

Continued on page 744, col. 3

Personalities in Chemistry

By A D McFadyen

DR. CHARLES M. A. STINE is a native of Norwich, Conn., where he was born in 1882. As a lad of nineteen he was graduated with honors from Gettysburg College with the degree of Bachelor of Arts. He remained at Gettysburg for post-graduate study, taking the Bachelor of Science degree in 1903; that of Master of Arts in 1904, and Master of Science in 1905. From there he entered Johns Hopkins University, becoming a fellow in 1906, and receiving the degree of Doctor of Philosophy a year later.

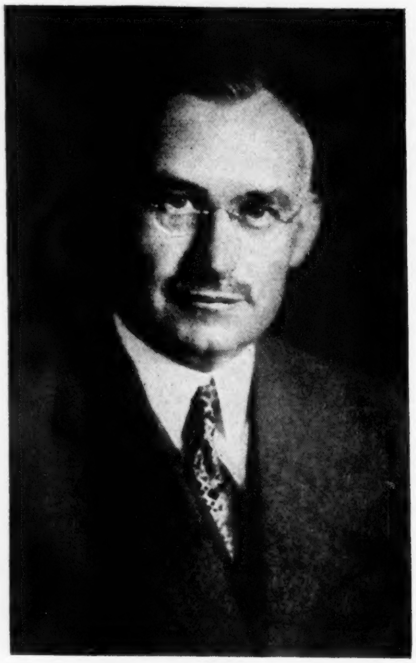
Shortly after leaving Johns Hopkins, Dr. Stine entered the employ of the Du Pont Company, joining the staff of the Eastern Laboratory at Gibbstown, N. J., where he was in charge of organic chemical research from 1909 to 1916. His work there led to improvements in safety explosives for use in coal mines and to improved low-freezing dynamites. Also, as a result of work done under Dr. Stine's direction during this period, the first commercial production of T. N. T. in this country was initiated. In 1917, he was transferred to Wilmington as head of the organic division of the chemical department. In 1919, he became assistant director of the chemical department and was named director in 1924. He continued in this position until June 1, 1930, when he was elected a vice-president and a director of the Company and was appointed a member of its executive committee.

Fostered Brilliant Developments

Under Dr. Stine's tenure as director of the chemical department of the Company, a number of significant developments were recorded, including light-stable lithopone pigments; improved finishes for household and industrial use; and more efficient processes for the manufacture of nitric and sulfuric acids.

One of the most valuable contributions to the technical development of the Du Pont Company during this period was the organization of fundamental research. The results of this work, initiated and sponsored by Dr. Stine, have been far-reaching. Out of this fundamental research, for example, have come neoprene chloroprene rubber and the protein-like polyamide compounds known as nylon.

Dr. Stine is a member of many scientific societies. These include the American Chemical Society, the American Institute of Chemical Engineers, of which he is a director; the American Association for the Advancement of Science, and the directors of industrial research. He is an honorary member of the Princeton Engineering Association, and for some years served as a member of the executive committee of the Division of Chemistry and Chemical Technology of the National Research Council. He also served as a member of the committee in charge of the American Institute of Chemistry, and as councilor of the American Chemical Society. He is a life member of the Franklin Institute, and a member of the executive committee of the Philadelphia Museum of Natural Science.



Charles M. A. Stine

For his achievements in "applied chemistry," Dr. Stine was awarded the Perkin Medal for 1940—one of the most coveted awards offered for valuable contributions to chemical science. The medal was presented at the New York Chemists' Club before a joint meeting of the Society of Chemical Industry, American Chemical Society, American Institute of Chemical Engineers, The Electrochemical Society, and Société de Chimie Industrielle.

In his acceptance speech, Dr. Stine traced the growth of U. S. organic chemical industry with the last two decades. He pointed to the tremendous strides toward national self-sufficiency brought about by its development and declared there was good ground for believing that self-sufficiency definitely makes for peace.

He took occasion to refute critics of applied science who hold its creations as responsible for the horrors of modern war. "They overlook," he said, "that horrible wars have been waged all down the years when there was no science as we know it today."

Dr. Stine was one of the earliest advocates of a popularized science. He has delivered hundreds of science lectures before various lay groups during the past thirty years, and has contributed to numerous magazines, journals, and books on the subject. Indeed, it would be hard to find a more sought after speaker; harder still to find a man who yields up so many of his busy hours to the apostolic mission of engendering greater interest in the science to which he has devoted his life.

Received Honorary Degrees

His services to science have been recognized previously by awards of an honorary degree of Doctor of Science by Gettysburg College and the honorary Doctor of Laws from Cumberland University. He is a member of the board of trustees at Gettysburg and is a trustee of the University of Delaware. He has served on the visiting committees for the departments of chemical engineering at M. I. T. and Princeton University.

As a member of the trustees' agricultural committee at Delaware, he has instituted many interesting experiments in soil conservation and in investigating diseases of cattle. He maintains a model dairy farm, "Foxden Farm," near Newark, Delaware.

In his leisure moments, Dr. Stine finds time for activities of varied nature. Deeply interested in hospital work, he has been active in fostering research in the field of chemotherapy. He is a member of the Board of the Delaware Hospital and chairman of the building committee. He has been for many years an enthusiastic board member of local institutions such as the Y. M. C. A., the Y. W. C. A., the Delaware Safety Council and the Wilmington Society of Fine Arts.

Dr. and Mrs. Stine and their two daughters live at 1100 Greenhill Avenue, Wilmington, Delaware.

MERCK

...A DEPENDABLE SOURCE OF PURE CRYSTALLINE VITAMINS

ACTIVE in the manufacture of pure synthetic vitamins ever since the first of these substances (ascorbic acid) was synthesized, Merck has played a prominent role in the development of this important line.

The synthesis of vitamin B_1, an outstanding achievement, was accomplished in the Merck Research Laboratories. Subsequently, the chemical identification and synthesis of vitamin E (alpha-tocopherol) were carried out in the Merck Research Laboratories, and more recently, workers in these same laboratories have succeeded in isolating, identifying, and synthesizing vitamin B_6. Pantothenic acid, a member of the vitamin B complex, has also recently been identified and synthesized in the Merck Research Laboratories. In addition to these noteworthy contributions, Merck aided in certain of the studies which culminated in the very recent identification and synthesis of the antihemorrhagic factor, vitamin K.

With vitamins commercially available as pure substances, it is now possible for the pharmaceutical manufacturer to formulate desirable vitamin combinations with consummate ease. By using these pure chemicals of known and uniform potency, the manufacturer can readily adjust the proportions of the individual vitamins to the particular requirements of his own products.

Micro-evaporation of a vitamin. Photograph taken in the Merck Research Laboratories.

Through institutional advertising in leading medical journals, exhibits at important medical meetings, and by the distribution of factual and up-to-date descriptive literature, Merck & Co. Inc. is constantly bringing the uses and advantages of vitamins to the attention of the medical profession for the benefit of pharmaceutical manufacturers who make dependable vitamin preparations.

ASCORBIC ACID MERCK
(U.S.P.)

The relatively low cost of Ascorbic Acid Merck permits its use in a variety of pharmaceutical products, and its brilliant white color is a distinct asset in the manufacture of straight vitamin C tablets or combinations in which a clear white color is essential.

Pellagra, for which nicotinic acid and nicotinic acid amide are specific, is probably the most serious nutritional disease in the United States from the standpoint of number of persons affected and economic loss entailed.

NICOTINIC ACID MERCK
(U.S.P.)
NICOTINIC ACID AMIDE MERCK

VITAMIN B_1 CRYSTALS MERCK
(Thiamine Hydrochloride U.S.P.)

The widespread deficiency of this important vitamin in modern diets and its expanding use in various clinical conditions have combined to create a demand which gives every indication of assuming unprecedented proportions.

The importance in human nutrition of this member of the vitamin B complex is rapidly being established and it appears that riboflavin deficiency may not be an uncommon occurrence in human beings.

RIBOFLAVIN MERCK
(VITAMIN G; VITAMIN B_2)

VITAMIN B_6 HYDROCHLORIDE MERCK

This newly synthesized member of the vitamin B complex has recently been found to be effective in relieving symptoms of a deficiency disease in human beings.

YOU ARE INVITED TO WRITE US REGARDING YOUR MANUFACTURING PROBLEMS AND REQUIREMENTS. LITERATURE ON REQUEST

MERCK & CO. Inc. *Manufacturing Chemists* **RAHWAY, N. J.**

New York • Philadelphia • St. Louis • In Canada: Merck & Co. Ltd., Montreal and Toronto

HEAVY CHEMICALS

Few Changes Seen in 3rd Quarter Contracts

No Buying Rush Felt as War in West Begins—Consumer Confidence in Producers is Reason—Tin Derivatives Soaring With Metal—Japan is Buying—Oxalic Acid in Better Supply

NOW that war has really come to Europe, no one in the United States seems interested in buying in volume for which consumers clamored last September. For this, producers may take a bow. Their level-headed attitude toward war business has built a confidence in the minds of buyers. Consumers have been getting their orders filled promptly, and there has been no indication of runaway prices. Those remembering the chaos of the last war would never have dreamed that manufacturers would do "business as usual" during this one.

But, no one can disagree that the American chemical industry has placed "honest enterprise" before the dollars dangling across the ocean. (Washington papers please copy.)

There seems little likelihood of any vast changes in contract quotations for the third quarter. Alkalies will remain the same. One or two industrials may move fractionally, but the broad list looks as settled as a golden wedding.

Seasonal Items Better

Seasonal items woke up during May, and volume was fair to good. These items begin to move a month earlier under normal weather conditions. Lead arsenate led the parade but there was a nice call for calcium arsenate, lime sulfate, bordeaux mixture, and nicotine sulfate.

Oxalic loosened up slightly during the period under review. Some spot inquiries went begging during April. It still isn't in great supply. Bichromates remained a bit tight insofar as spot demand is concerned. Producers say the situation can be traced to export goods moving from second hands.

At month's end, it was impossible to get a quotation on tin derivatives that would stand up a day later. Tin crystals were at 41½ cents and going up. Oxide hovered around 63 cents. Producers, however, were quoting only on definite inquiry. Which gives rise to the opinion that this is where substitutes will step in. Most manufacturers have branded items which have been improved remarkably during the past few years. And, based on current quotations they can be sold at half the price.

Export situation has developed a most interesting incident. A noted Japanese house has queried one factor on an item which it hasn't purchased in the United States for more than twenty years. Reports also reach this department that

Important Price Changes

	April 30	May 31
ADVANCED		
Calcium arsenate	$0.06	$0.06½
Copper, electrolytic	.11¼	.11⅜
Sodium silicofluoride, imp.	.07¼	.07¾
Tin, crystals	.37	.41½
Tin, metal, Straits	.47½	.54
Tin tetrachloride	.23¼	.26½
DECLINED		
Molybdenum trioxide, pure	$1.00	$0.95

Japan is out of South America as far as chemicals are concerned, and is appearing in the U. S. market as a buyer in an odd turn-about-face.

The Dutch East Indies has seemingly recovered from its invasion scare. About the second week of May inquiries for formic acid used in rubber coagulating process, came into the market at a pace described as "furious." Mexico inquiry has dwindled due to July elections. Orders now consummated would be for July business, and politics being what they are south of the Rio Grande, buyers would rather "wait and see."

LaPine Triples Space

Arthur S. LaPine & Company, Chicago chemical distributor, has tripled its space within the past few months. Formerly

Arthur S. LaPine

located at 114 West Hubbard, company moved on to 121 West Hubbard, where larger space was available for expanding business.

South America has been disappointing as a consumer. It is well known that the German I. G. shipped hundreds of tons of material to agents while they could. Apparently, these tremendous inventories have not been completely worked off. Some acids have moved to Egypt and Greece to be used in manufacture of munitions for Allies.

England, surprisingly, is still shipping. Goods are moving to South America and Empire ports at prices which suggest that manufacturing and shipping is being favored with a government subsidy to hold markets. Companies in British possessions are ordered to buy only from the Empire which is understandable as an Exchange move.

Inquiries for zinc chloride in large quantities have come into the market from India, and it is felt that some, at least, will materialize in the form of orders.

WASHINGTON

Continued from page 741

Finally, the Vinson-Trammell act, limiting profits on naval shipbuilding to 10 per cent., and on both Naval and Army airplanes to 12 per cent., is amended so that it excludes contracts and subcontracts not in excess of $25,000. The old exclusion was $10,000. The purpose is to cut Treasury inspections and auditing.

The Reconstruction Finance Corporation is to be the center of financing of private plants. The desire of the Administration is that new plants be located in the interior. A new bill empowers the RFC to create subsidiary corporations without limit to advance money to construct and equip plants, and to provide working capital. And it will buy and store stocks of essential materials, and resell to private industry.

The chemical industry stands high on the list of those which are prepared for national defense expansion. For months, a committee of the industry has had plans ready for eventualities. Many of the commercial products of the industry are essential to national defense, and there is capacity for added increase in output. The appropriation for the Army's Chemical Warfare Service for the next fiscal year has been increased from $3,698,000 to $24,604,000.

To some extent the program remains unrealistic. More money has been provided than can be spent within a reasonable time. General George C. Marshall, chief of staff, told the Senate appropriations committee, May 22, that he would be "embarrassed" by more money—and after that the additional billion was asked. Roads are essential to national defense, yet the President forced a 25 per cent. cut in the highway authorization act on threat of a veto.

ADVERTISEMENT—*This entire page is a paid advertisement.* *Prepared Monthly by U. S. Industrial Chemicals, Inc.*

U.S.I. CHEMICAL NEWS

June ★ A Monthly Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1940

Alcohol, Derived Chemicals Widely Used in Dyestuffs

Many U.S.I. Products Employed As Both Solvents and Reagents

Denatured alcohol, as a solvent and as a raw material for many derived chemicals, has come to occupy an outstanding position in the dyestuff industry. Other U.S.I. products, notably acetone and normal butyl alcohol, produced by fermentation processes, have also found increasingly wide use in dyestuff manufacture. Still broader markets are expected under the stimulus of active research in the development of new and better dyes.

Double Role of Solvents

Solvents of this type often play a double role in dyestuff manufacture, serving as a true solvent where no chemical reaction is involved, or as a chemical component where reactions take place. While only incidental reference is made in this article to this second aspect of the application of solvents, the utilization of solvents in chemical reactions comprises a major branch of organic chemistry, including dyestuff intermediates such as acetoacetanilid, ethyl acetoacetate, sodium ethyl oxalacetate, and similar chemicals.

Use of Denatured Alcohol and Solox

Both denatured alcohol and Solox, U.S.I.'s proprietary alcohol-type solvent, are widely employed for solvent purposes in the manufacture of developed, acid and direct dyes. The alcohol serves as a solvent or dispersing medium for the components without reacting

(Continued on next page)

Sterno Stoves and Canned Heat Boon to Boat-Owners

NEW YORK, N. Y. — Man-sized meals afloat are easy to prepare when motor-boat or cruiser is equipped with the Sterno Galley

Stove. Stove burns Sterno Canned Heat—the convenient, non-spillable fuel.

Basis of Canned Heat is alcohol solidified by a congealing agent.

Improves Drying Properties Of Oils with Nitric Acid

ROYAL OAK, Mich. — That the drying properties of oils can be improved by treatment with nitric acid is claimed in a patent granted to an inventor here.

The acid, it is said, serves both as an oxidizing agent and as a reagent for controlling the pH value of the solution.

The process is reported to be applicable to linseed, soy bean, sunflower, perilla, rapeseed, and oiticica oil.

Additive Agent Aids Prevention of Gum Formation in Motor Fuels

Anthranilic Acid, Reported Widely Applicable as Secondary Inhibitor, Is Preferably Dissolved in C. D. Alcohol No. 11

Specially Written for U.S.I. Chemical News by W. A. Smith, Buffalo, N. Y.

A new weapon—anthranilic acid—has recently been made available for use in the war against gum formation in motor fuels, a difficulty that constantly faces the petroleum chemist. This compound is reported to be available in the proper grade at a reasonable price, and to be effective over a wide range of fuels.

When motor fuels from different sources or of different ages are mixed, a marked tendency toward gum formation is apparent. Anthranilic acid is said to be widely applicable as a secondary inhibitor to prevent this gum formation. For example, if it is desirable to add new gasoline to a storage tank already partially filled with material relatively old, the accelerating effect of the old, partially oxidized fuel on the oxidation of the added gasoline can be prevented by the addition of the proper amount of anthranilic acid, it is claimed. This property of anthranilic acid is so marked that it is often possible to obtain acceptable blends by adding fresh gasoline to motor fuels that have aged beyond their induction period. This is especially advantageous where equipment is not available in which to re-run the older material.

Reduction of Copper Corrosion

Tank cars, barges, and tankers often return to the refinery with relatively minor quantities of badly oxidized liquids, which seriously contaminate the next shipment placed in them. In one case recently reported, occasional instances of valve sticking in customers' cars led to investigation of the gasoline in the bulk storage tank, which was found to have a copper dish corrosion of 125 mg. Further tests on six tank cars received from the refinery showed copper corrosions varying from 19 to 72 mg., with an average of 61, on material that had tested about 5 mg. at the refinery.

Anthranilic acid added to the material in the tank cars at the bulk plant in the proportion of ¼ pound to 1,000 gallons, was reported to reduce the copper corrosion to a range from 3 to 9 mg., with an average of 6.

Other gum problems have been introduced by the admixture of incompatible blends: for example, when ordinary motor fuels are mixed in customers' fuel tanks with catalytic and polymer fuels (some of which are purposely

(Continued on next page)

New Reaction Products Suggested for Coatings

WILMINGTON, Del.—That paints, varnishes, and lacquers of excellent durability and discoloration resistance can be formulated from the reaction products of an ester of a heterocyclic alcohol and an unsaturated rosin acid with maleic anhydride is revealed in a patent granted to an inventor here. The reaction products are said to be suitable for use in nitrocellulose lacquers and in lacquers containing cellulose derivatives.

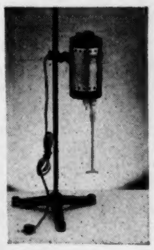
Typical lacquer formulation, according to the patent, has the following proportions by weight:

Nitrocellulose	12
Ethyl Alcohol	5
Toluene	26
Butyl Alcohol	5
Ethyl Acetate	6
Butyl Acetate	26
Damar Gum Solution	10
Reaction Product	10

Ethyl Alcohol, Butyl Alcohol, Ethyl Acetate, and Butyl Acetate are produced by U.S.I.

New Laboratory Mixer Is Geared for Heavy Fluids

NEW YORK, N. Y.—Special gearing on a new laboratory mixer allows it to run continuously on even the heaviest fluids, it is announced by a manufacturer here.



Applications for the mixer are said to include paints, lacquers, glues, heavy oils, latex, asphalt, syrups, food products, and pharmaceuticals. Speed is reported to be adjustable from 0 to 1,350 RPM. Mixer may be used with inflammable liquids and is explosion-proof under these conditions, says the maker.

Highway marking paints are subjected to unusually severe service conditions, being constantly exposed to weathering and traffic. In many states, specifications for traffic paints call for a solvent composed of 20% normal butyl alcohol, 40% acetone, and 40% denatured alcohol No. 1 (by volume). When added thinners are to be employed, amyl acetate is frequently specified, in the proportion of 5 gallons to 500 gallons of finished paint. Normal butyl alcohol, acetone, S. D. Alcohol No. 1, and amyl acetate, essential ingredients of traffic paints, are produced by U.S.I.

June ★ **U.S.I. CHEMICAL NEWS** ★ 1940

Improves Resinous Stocks By Using Alcohol Varnish

GLEN ELLYN, Ill.—Resinous stocks for use in molded products that must be substantially free from dimensional changes can be prepared with the aid of alcohol varnishes, according to a patent granted to an inventor here.

The process, it is said, consists in treating the web which is to be saturated first with a water-type penetrating varnish, which introduces 20-30% of the desired resin content. A second treatment with alcohol-type resinous varnish increases the resin content.

Process, the inventor claims, results in a product that combines most of the strength obtained by using alcohol varnishes alone with the non-swelling properties resulting from water-type varnishes.

Solvents In Dyestuffs

(*Continued from previous page*)

chemically, and the dyes are later separated from the reaction mixture as solids.

In other cases, notably the azoic and spirit-soluble aniline types, the dyes are sold dispersed in alcohol, or in dry form to be dissolved in alcohol or in alcohol-water mixtures.

An important use of alcohol is as a direct ethylating agent used in making diethyl aniline, and through the medium of diethyl sulphate and other ethyl esters in the production of intermediates. Acridine and developed type dyes are of such origin.

Application of Other Solvents

Other U.S.I. products used in the dyestuff industry include ethyl acetate, acetone, butyl and amyl alcohols. Ethyl acetate has a limited application as a solvent for the aromatic reacting materials in the manufacture of acridine and milling dyes, and also as the starting point for ethyl acetoacetate and its derivatives.

Acetone is used as a solvent for the reacting components in the manufacture of basic dyes such as malachite green, methylene blue, etc.

Butyl and amyl alcohols are used as solvents much as ethyl alcohol is used, except that these alcohols are anhydrous and relatively water-insoluble. In addition, butyl and amyl alcohols are used for alkylation, and in the preparation of their respective amines for the production of direct, developed, acid, and vat dyes.

U.S.I. will gladly give further information on the use of its products in dyestuff manufacture.

Recommends Alcohol for Extracting Castor Seed

Extraction of castor seed with alcohol is more satisfactory than pressing the seed in a hydraulic press, it is reported in the *Journal of the Indian Chemical Society.* Advantages of alcohol extraction are said to be: possibility of using completely decorticated seed; greater yield as No. 1 oil; higher nitrogen content in cake; lower manufacturing costs.

Secondary Gum Inhibitor

(*Continued from previous page*)

left sour). Such admixtures produce very unstable blends, but compatibility can be accomplished in large measure by the judicious use of anthranilic acid, it is indicated.

Copper sweetened distillates are said to yield more readily to inhibition with anthranilic acid, either alone or in connection with one of the common hydroxy inhibitors, than when anthranilic acid is not used. Doctor sweetened materials are also said to display the same effect, although to a lesser degree.

C. D. Alcohol Used as Solvent

While finely ground anthranilic acid is directly soluble in practically all types of cracked distillates in the required quantity (which usually ranges from 1 to 3 mg. per 100 cc.—equivalent to 1-1/3 to 4 ounces per 1,000 gallons of motor fuel), it is much more practical to dissolve it in a suitable solvent, such as Anhydrous Alcohol C. D. 11, or one of the other Government-approved ethyl alcohols for use in motor fuel. This solution is pumped into the tank during blending. Anthranilic acid may also be dissolved in isopropyl alcohol, isopropyl ether, and acetone. Suggested proportions are:

Solvent	Gals. of Solvent Required for 1 lb. of Anthranilic Acid	Gals. in Resulting Mixture
Alcohol	0.9	1.0
Isopropyl Alcohol 98%	1.2	1.3
Isopropyl Ether	2.9	3.0
Acetone	0.4	0.5

These quantities are based on room temperature, no heating being required, and, in the case of ethyl alcohol and acetone, virtually no agitation.

When other liquid inhibitors are used in connection with anthranilic acid, it will usually dissolve in the inhibitor directly in the required proportion.

(Anthranilic acid is a patented product. U.S.I. will refer readers to the holder of the patent.)

TECHNICAL DEVELOPMENTS

Further information on these items may be obtained by writing to U.S.I.

Petroleum sulphonates are said to be available in a purified form, permitting their use in the manufacture of soluble cutting oils, emulsion polishes, and other products. They are said to offer possibilities in the manufacture of paints, inks, and rust preventatives. **(No. 340)**

U S I

A new cleaning compound, said to be intended especially for rugs and upholstered furniture, is described as non-inflammable, and is reported not to leave any odor or residue. **(No. 341)**

U S I

A new coating for electrical insulated wire is reported to be a rapid-drying, transparent, flexible compound that will stand any electrical test that an insulating varnish requires. It is said to penetrate paper or cloth instantly. **(No. 342)**

U S I

Microorganism control in the paper industry is said to be effected with a compound recently placed on the market. Maker claims that the compound is chemically stable, non-corrosive to metals, and free from odor. **(No. 343)**

U S I

A new wetting agent overcomes the tendency of water colors to "creep" on the surface of acetate sheets, according to the manufacturer. It is said that the wetting agent does not increase viscosity, nor affect opacity and color intensity. **(No. 344)**

U S I

A new hose is reported to be suitable for spraying paints and lacquers, and for handling benzol, carbon tetrachloride, drying oils, thinners, turpentine, and gasoline. **(No. 345)**

U S I

A cellophane cement is described as transparent, tasteless, odorless, moisture-proof, resistant to acids and alkalis, readily applied, adaptable to food packaging. **(No. 346)**

U S I

A new tracing medium is said to produce ink-like opacity from hard drawing pencils, giving ink results at pencil speed. Medium is reported to have exceptional strength. **(No. 347)**

U S I

A protective paint for use in carburizing and similar metallurgical processes can be applied by dipping or spraying, requires no special skill in application, expands and contracts with the protected metal, it is reported. **(No. 348)**

U S I

Synthetic drying oils, recently patented, are described as liquid esters of natural higher fatty acids, substantially free from uncombined hydroxyl groups. **(No. 349)**

SOLVENTS

Lacquer Trade is Buying Toluol Substitute

Acetone Withdrawals on Contract Close to Production—Spot Material Scarce—Methyl Ethyl Ketone Continues Strong—Far East Inquiries Appearing in Volume—Production Figures

TWO factors were present in solvent market during May, both good. Automotive production continued at full capacity, and scarcity of toluol drove lacquer manufacturers into the substitute market. Substitutes, mostly branded, are naphthas. They are said to be offering results very favorable when compared with those obtained with toluol.

Acetone was readily available on contract, though spot material is still tight. Withdrawals continue at a good pace, accounting for practically entire production. Export inquiry has been quiet. There is talk, however, that some consumer material is reaching second hands, who offer it in the foreign market.

Methyl ethyl ketone has been taken in good volume by paint and lacquer trade. In addition, material is now being used in de-waxing of lubricating oil. It is also being substituted for ethyl acetate in certain operations. May was slightly under April on this item, however.

Isopropyl Moving Well

Isopropyl alcohol is still acting nicely. Rubbing alcohol compound manufacturers are calling for material in fair quantities as reported here last month. Government restrictions on ethyl alcohol used normally, regarded as a nuisance by producers, provide key to this situation.

Export demand was more moderate. Belgium and Holland were eclipsed as buyers during period under review. But the Far East seems to be entering the market on a larger scale. Inquiries on new business are reported favorable. South America continues slow due to letter of credit situation, which gives preferential treatment to countries with whom Latin nations show favorable trade balances.

Important Price Changes

ADVANCED
None

DECLINED
None

Ethanol Output Up

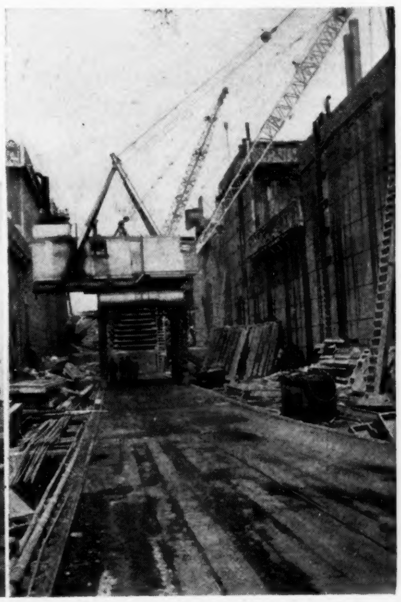
Ethyl alcohol produced during April, 1940, amounted to 20,217,860 proof gallons against 17,857,461 gallons for April, 1939, and 20,983,157 gallons last month. Alcohol withdrawn for denaturation was 17,610,698 gallons as against 13,252,629 gallons in March, 1939. At the end of the month stocks in bonded warehouses were 20,956,925 gallons contrasted with 29,624,646 gallons in April, 1939. Production of completely denatured alcohol was 267,687 gallons as compared with 240,918 gallons in April, 1939, and 413,609 in March, 1940.

Methanol Production Drops

Production of synthetic methanol during April, 1940, was 3,486,233 gallons as against 2,276,385 gallons in 1939, an increase of 53%. Production in April was .67% higher than for the month of March. Crude methanol production totaled 441,888 in April and 389,423 in the same period last year.

At right is shown a lock of the Santee-Cooper dam near Pinopolis, S. C. Below is shown Tournapull earth moving equipment carrying 30 cu. yds. per load. This is operated by one man. It loads automatically, unloads and spreads the dirt to form the dirt dam.

Photographs taken by Dr. C. R. Downs, member of Chemical Industries Editorial Consulting Board.



Harold Boeschenstein

President of the Owens-Corning Fiberglas Corporation of Newark and Toledo, Ohio, who has been chosen an outstanding alumnus of the College of Commerce and Business Administration of the University of Illinois.

Personals

A V. Wilker, National Carbon vice-president, and F. J. Curtis, manager, Monsanto development department, jointly discussed "What Industry Expects of the Chemical Engineer" before Charleston (S. C.) Chemical Engineers Association.

Charles A. Seibert, technical laboratory staff, Du Pont Dyestuffs Division, discussed "Atmospheric (Gas) Fading of Colored Cellulose Acetate" before American Association of Textile Chemists & Colorists at Rochelle Park, N. J.

Dr. Donald Price, research director, National Oil Products, was elected chairman, Metropolitan Microchemical Society at meeting held at Fordham. Harold V. Wadlow, Bell Telephone Labs., was made vice-chairman, Dr. Julius A. Kuck, C. C. N. Y., secretary-treasurer.

W. L. Badger, Dow Chemical, will discuss "Application of Unit Operations of Chemical Engineering to the Food Industries" at first annual meeting of Institute of Food Technologists being held in Morrison Hotel, Chicago, June 17-19.

Samuel H. Clark, Whittaker, Clark & Daniels, was given a surprise party at Biltmore Hotel, N. Y. City., this month on completion of "first 50 years" with company.

Kingsland Cooperage Expands

Kingsland Cooperage Company has completed erection of new wood barrel factory containing over 100,000 square feet of manufacturing space, with 5 acres of land storage.

FINE CHEMICALS

No Spot Caffeine, Theobromine Available

May Business Shows Healthy Improvement—Some Consumers Seen Buying For Fall in Anticipation of Price Rises—Mercurial Price Boost Forecast—Tartars Strong—Exports Heavier

BUSINESS was good in fine chemicals during May. The whole list moved well with no exceptions. Both consumers and wholesalers ordered in quantity. Feeling is that autumn isn't too far away. Buyers, it seems, are protecting themselves "just in case."

Quinine consumers have shown uneasiness in the face of the current situation. Even if shipments hold up, prices will have a buoyant tendency. During this month, the surcharge has risen 1 cent, which adds to cost of bringing in material and this was immediately reflected in current quotations. Surcharge has nothing to do with the price of material, which remained static.

An interesting situation has developed in connection with caffeine. Toward month's end, the *New York Times* ran a story describing an acute shortage of the material. The story, of course, was based on imported caffeine which came from Holland. It did not take into account the fact that U. S. consumers have been independent of this source for several years. This takes care of domestic requirements.

Other countries evidently are not so fortunate. In fact they must be extremely unfortunate. For there is more than one buyer who will permit anyone offering caffeine in quantity to name his own price. Theobromine is also on the "short" list. Material is not available in anything like the quantities for which there are buyers. Domestic customers are protected by regular sources, however.

Mercury Leaps Again

Mercury went on a price rampage again during May. It started up and is still going. Mercurials have not followed, but a babe in arms could tell you what's coming. Corrosive sublimate is 80 per cent. mercury selling at $2.04 a pound. Contrast this with $200 a flask for mercury, add in your manufacturing cost, and you have—what?

It goes without saying that mercurial buying has been quiet. Prices have been too high, and this condition shows no sign of improvement. Producers haven't stocked up on the raw material, so the market is bound to be sensitive.

One thing kiting prices have done is open a number of mines that haven't seen a pick and shovel squad in years. When mercury was normal, i.e. $82 a flask, domestic mines couldn't compete with material moving into this country notwithstanding the 45% duty. Now it's a cinch.

Important Price Changes

ADVANCED	April 30	May 31
Cream of Tartar	$0.30¾	$0.32¼
Quinine surcharge	.03	.04
Mercury, metal	171.	195.
Silver bullion	.34¾	.35⅝
Silver nitrate	.26⅞	.27⅜
Tartaric acid	.37¼	.39¼
DECLINED		
Ephredrine alkaloid	$1.50	$1.00
hydrochloride	1.25	.80
sulfate	1.25	.80

Formaldehyde has been going nicely with synthetic resin manufacturers enjoying one of their best years. Prices have been firm, with shipments better than average for this time of year.

On the export front, Latin America has been buying in larger quantities which would seem to indicate that the store of German goods built up before the blockade is about depleted. None in the field has ignored this factor in the export picture, but from here on, the keynote seems to be "optimism."

Certain tartar items reflected the higher price in the primary market. But two, Seidlitz Mixture and Rochelle Salt failed to go along.

Personnel

JOHN Paul Remensnyder and Eric Rathje were elected assistant vice-presidents of Heyden Chemical Corp., at a recent directors' meeting . . . George C. Miller has been named sales manager, Carbide plastics division . . . Henry L. Bottemiller joins sales staff, Titanium Pigment Corp. . . . Bruce K. Brown has been elected to Standard Oil directorate . . . Dr. P. H. Dougherty has joined Merck new products division . . . Dr. Howard A. Smith has been made chief metallurgist, The Duraloy Company.

Eric Rathje

Louis F. Lippert has been named Pluramelt sales manager, Allegheny Ludlum Steel Corp. . . . Harvey Thelan joins Owens-Illinois Can Company . . . Dr. J. K. Steward rejoins Sherwin-Williams pigment color and chemical division . . . William M. Gibson is appointed superintendent, Kankakee, Ill., plant, American Asphalt Paint Company . . . William C. Schoenfeld has been added to staff, Foster D. Snell, Inc.; Richard Kieselbach has taken over accounting duties . . . J. C. Pirkle takes over North Carolina representation Quaker Chemical Products.

R. K. Turner is named superintendent, Carbide South Charleston plant, succeeding R. N. Graham who transfers to New York headquarters . . . Dr. Michael S. Shenk, consultant, now makes his headquarters at Claremont Industrial Laboratories, N. Y. City . . . Otto Hense gets newly created pigment division sales managership at Eagle-Picher Sales Company . . . William J. Monran shifted to Philadelphia staff, Archer-Daniels-Midland . . . Charles G. McCabe added to technical staff, Battelle Memorial Institute . . . E. A. Berry elected treasurer, Koppers Company, succeeding S. T. Brown who retired because of illness . . . J. R. Kumer, Jr., named manager, stainless bar and wire sales, Allegheny Ludlum.

Monsanto Opens Laboratory

Monsanto Plastics Division opened new Springfield, Mass., research laboratory which now houses 70 technicians employed in plastic research activities. Gaston Dubois, vice-president and member of executive committee, and J. C. Brooks, vice-president and general manager of Plastics Division, together with research heads of all Monsanto divisions attended opening. Several papers on plastics were delivered at dinner held in conjunction with opening.

Priorities Features Borax

Broad range of industries in which borax finds extensive application is sketched in June *Priorities*, house organ of Prior Chemical. Article traces history of product from discovery of first important deposit to time when borax was scarce and in urgent demand.

Pyridin Process Improved

New process, involving tiny pump and bulb-shaped saturator, developed by Republic Steel boosts pyridin production approximately 50 per cent. Coincidentally, Reilly Tar & Chemical engineers have perfected a more efficient method for conversion of pyridin into sulfapyridine.

Hudson Wins Richards Medal

Prof. Claude S. Hudson received 1940 Theodore William Richards Medal, awarded by Northeastern Section A. C. S.

COAL TAR CHEMICALS

Toluol Selling at 60 cents for Export

Nearly 1,500,000 Pounds Reached Europe in March—Benzol Supply Still Far Outstrips Demand—Price Shading Rumored—Xylol Supply Adequate—Cresylic Normal—Production Figures

SIR Arthur Conan Doyle once wrote a story about a newspaperman who was assigned to become a street beggar for a day and write the story of his experiences. When he counted up his offerings, he was amazed to find that they were five times his daily salary as a reporter and he forthwith resigned his job.

The current situation on toluol might readily create a similar situation. In fact one producer was wondering whether some small contract buyers on the Atlantic seaboard might not find jobbing toluol more profitable than the lacquer business. Toluol can be bought on contract for 26½ cents, and material is being delivered. In drums at dockside it brings 60 cents. Plenty of it is reaching the docks, too.

Seller A Mystery

The Department of Commerce reports that a little under 1,500,000 pounds of toluol entered foreign countries during March. The bulk of it was consigned to Hungary and Switzerland. But chances are that it didn't remain in either country very long. The question to be asked is: "Who sold it?" There is no spot material available from producers in quantity. No one will deny that there is some. These export figures, however, run into the kind of volume that makes producers throw up their hands and laugh.

Just the opposite situation confronts sellers on benzol. It can be obtained in any quantity, but no one wants it. There is talk that prices can be shaded on the right quantities, but no out and out break in the market is anticipated. Some feel it might help. Surely production shows no sign of offering relief. Steel output drops normally do not affect coke ovens for three months. Thus the slack of the past two months will be offset by renewed activity brought about by anticipation of defense program requirements. Coke ovens accelerate immediately on the upswing.

Xylol Is Plentiful

Xylol is long rather than short as far as supply is concerned. Shipments continue fair. Plentiful material stems from disinterest in xylol abroad, after it had been favored with sizeable inquiries during first quarter.

Demand for cresylic acid maintained a pace held to be favorable with current production. Phenol continued to move, but the export flurry noticeable in April slackened somewhat. Intermediates were slow.

Important Price Changes

ADVANCED
None

DECLINED
None

Pricewise there was nothing to report. Little change was expected in contracts to be consummated later this month.

Production Figures

By-product coke production for April slumped from March figure of 4,124,748 to 3,984,347 tons, according to Bureau of Mines report. Tar oil recovery was placed at 48,831,304 gallons against 50,541,981 in March, and 35,664,547 in April of last year. First four months' recovery was 206,271,828 gallons compared with 156,619,951 in the same period of the previous year.

Light oil production last month totaled 16,108,134 gallons, slightly under March figure of 16,672,441, but well above the 11,764,796 gallons produced in May, '39. Output during first four months was 68,043,461 gallons compared with 51,664,713 last year.

Foreign Literature DIGEST

By

T. E. R. Singer

IN *Angewandte Chemie* 53, 93-98 (1940) P. Pfeiffer has a lengthy article with many references on the structural principles of salts, which is an extract of a lecture given before the *Verein deutscher Chemiker* at the 52nd meeting. In the same journal, same issue, 98-99, H. P. Kauffmann gives methods of testing oleins. In the same journal, same issue, there is a description of experimental methods for the determination of adsorbed soap films (100-103) which also gives some results obtained by these methods. Pages 103-107 of this issue contain a detailed report, illustrated with microphotographs, of an investigation by M. von Ardenne and D. Beischer on investigations on colloidal metals as catalysts made with the Universal electron microscope. This work was carried out both in the laboratory of von Ardenne and at the *Kaiser Wilhelm Institut fü physikalische Chemie und Elektrochemie* at Berlin-Dahlem. Finally, this issue contains an article on pages 107-109 by H. Lohmann on the mechanical properties of acetate rayon. In the same journal, 53, 119-123, A. Scheunert, Director of the Veterinär-Physiologischen Instituts of the University of Leipzig reports on the production and preservation of foodstuffs containing vitamins, while in the same issue, 123-125, A. Lunde, H. Kringstad and A. Olsen report on a related subject, the preservation of vitamin B, in vegetables being cooked or preserved. This work was done in the *Forschungslaboratorium der norwegischen Konservenindustrie,* at Stavanger, Norway.

In the field of mikrochemistry, U. Ehrhardt of the I. G. Farbenindustrie at Bitterfeld describes the use of electrometric methods, including conductiometric analysis.

The use of glass electrodes in pH measurement is exhaustively treated in an article by A. H. W. Aten, L. Boerlage and J. E. Garssen in *Chemisch Weekblad* 37, 158-166 (1940). This work comes from the Laboratorium voor Elecktrochemie of the university at Amsterdam. G. Elsen gives his sixth report on quantum mechanics and the benzene problem in this journal, 37, 199-209, and on pages 214-223 W. L. C. Veer has a very comprehensive article on the chemistry of the melanines, including many literature references.

RAW MATERIALS

Market Quiet as Western Front Turns Active

Transactions on Small Lot Basis—Chinawood Market Sensitive Due to Small Stocks—Carnauba Eases—Naval Stores Buyers Trading Cautiously—Britain Seen Only Export Buyer

THE market for miscellaneous raw materials weathered the past month very well considering the further disruption of shipping and foreign trade caused by the full blossoming of the war.

On the whole, quiet conditions prevailed in the market for oils, fats, and waxes. A few vegetable oils had rising tendencies and have attained small increases in price over last month; however, the general trend of oils has been downward. Transactions, as noted for some time, were still on a small-lot basis.

Chinawood Inventory Low

Although the supply of chinawood oil continues small, the lack of demand has been greater and has offset any tendency to bring about any sharp rise in price. It is generally felt that because of these limited supplies any indicated increase in demand will bring about a higher price structure.

Supplies of perilla oil on spot have been pretty well cleaned up and offerings are light. Reports of the production of this oil gain interest when it is realized that production of perilla seed in Manchuria is officially said to be 154 million pounds, or 1,000,000 lbs. less than in previous years.

The carnauba wax situation which was very pressing last month has now eased somewhat as evidenced by the definite drop in price.

Naval Stores Quiet

During the first part of the month the naval stores situation was very quiet. Many consumers and dealers were still inclined to hold to conservative course in view of future developments. Prices had general downward trend. The absence of government supplies, which were withdrawn from the market, was generally credited with the firm tone. In the middle of the month extension of war operations immediately affected export business and prices of turpentine and rosin dropped. Some cargoes consigned to Europe before the spread of the blitzkrieg were returned to port. It is felt that export movements to Europe for the balance of the naval stores season will be limited to the United Kingdom. The seriousness of this belief can be realized when it is known that in the past two years 250,000 barrels of rosin were exported to the continent and a similar amount to the United Kingdom; with the removal of the shipments to the continent, exports to Europe will be reduced by 50 per cent.

Important Price Changes

	Apr. 30	May 31
ADVANCED		
Olive oil, denat., dms.	$0.96	$1.25
edible, dms.	1.85	2.00
foots, dms.	.08¼	.08¾
Rapeseed oil, denat.	.17	.17½
Sperm oil, bleach, 38°, dms.	.1050	.1080
DECLINED		
Wax, bees, white, bleach	$0.38	$0.35
carnauba, No. 3 chalky	.64	.58
Lard	6.50	5.50
Copra, coast	.0165	.0160
Oil, chinawood	.23	.22½
coconut, manila, crude	.03¼	.03
Oil, linseed, raw	.1080	.1020
peanut, crude	.06⅜	.05⅞
soybean, dom., crude	.07	.06⅝
Tallow, animal, edible	.05¼	.04½

Texas Gulf Sponsors Research

Texas Gulf Sulphur Company inaugurates long range program of research at Institute of Paper Chemistry, Appleton, Wis., to study function of sulfur and its compounds in production of sulfate pulp, and possible use of sulfur in combination with paper products.

Potash Company Adds Products

Potash Company of America is now producing caustic potash and potassium chlorate at newly completed Carlsbad, N. M., plant. Manufacture of other potassium salts in near future is possibility, company reports.

Adams Moves Offices

Fred C. Adams & Co., chemical distributor, moves offices to 2155 West Hubbard st., Chicago.

Fusner Corp. to Build

Fusner Corp., Indianapolis fertilizer producer, will build $100,000 plant at Sandusky, O.

AGRICULTURAL CHEMICALS

Uncertain Conditions Complicate New Contracts

Ammonia Sulfate Price May be Tilted—Protective War Clauses Considered By One Producer—Organic Fertilizer Material Still Slumping—Exports Lively on New Business—Tag Sales Up

SPOTLIGHT centers on 1940-41 contracts in agricultural chemicals. It was believed that prices would be set this week, but so many factors enter into the situation that nothing has been settled. There is a feeling that industry is being eyed suspiciously in Washington, which doesn't help.

Best opinions are that ammonia sulfate cannot remain where it is, and small increases are considered likely. Fact is stressed that domestic producers seem to be sitting on the world supply right now. However, the law of supply and demand, unfortunately, is not a New Deal statute.

Potash fertilizers probably will open unchanged in new contracts. Basing points are expected to differ, though. Main point here is that contracts will offer coverage for consumers over full period, according to present indications. Factors are moving slow in preparing them, however.

Most interesting development was consideration by one factor of contracts containing protective war clauses. This would permit producers to meet any theoristic legislation that may affect market. Chances are that long term contracts generally will contain more clauses than in other years. Uncertainty of future surely make this contract season extremely hazardous for suppliers.

Important Price Changes

	Apr. 30	May 31
ADVANCED		
Fish scrap, Jap., sardine meal, May shipment	$53.50	$56.00
spot	53.00	57.00
DECLINED		
Blood, dried, dom.	$2.85	$2.75
high-grade	2.90	2.75
import	2.85	2.60
Nitrogenous material, East Coast production points	2.50	2.40
Tankage		
unground feeding	3.00	2.75
high-grade feeding	3.35	2.75
import, S. Amer.	3.25	2.90

Plight of organic fertilizer material runs counter to all expectations. If last war's criterion was respected, organics certainty had a speculative appeal some months ago. Yet during the whole period of this conflict, material has been depressed.

Exports have livened up. Inquiries are reaching market for new business from many quarters. This is, of course, "duration of war" business. But it will help while it lasts.

Business, however, isn't the big topic now. Everyone is talking about contracts, and the conversation probably will go on for a while before signing begins.

Total fertilizer sales as indicated by the sale of tax tags in the 17 reporting states amounted to 406,474 tons in May.

PIGMENTS AND FILLERS

Titanium Shipments Set a New Record

Colors Are Slow in Domestic Market But South American Buying Swells Volume—Outdoor Painting Season Seen Put Off Until Fall—Carbon Black Shipments to Akron Slackened

"SLOW" is the word for the domestic market insofar as colors are concerned. It is now felt that the outdoor season has gone over to autumn. May business started encouragingly, the warm, fine days offering promise of delayed spring activities. However, the rains came again and washed away the hopeful indications.

Some volume is moving to manufacturers producing mixed goods for export. More and more emphasis is placed on exports of both primary and finished goods. It isn't that business isn't ahead of last year in all departments. It's just that seasons have gone topsy turvy, causing the loss of some volume that ordinarily would be in the current picture.

Titanium pigments, however, are moving counter to the trend. Last month's business set a new record for the year, and overtook last year's peak. The only reason for this increased business is that customers are buying and using more.

Carbon black producers have felt sluggish indications from Akron for the first time in months. However, contracts will no longer be on a quarterly basis with one factor. They will cover thirty-day periods only. But current prices will remain in effect for July at least, according to best opinion.

Casein Price is Raised

Casein finally dropped its "forgotten product" status during the period under review. Prices firmed, then moved up. Whether they will stick may be another story. Tales persist that soft spots can be found in the market on sizeable quantities. Then, there is the new flush—reported as no better than normal—with which the market must contend. Argentine material is said to be in fair demand due to domestic orders filtering into Buenos Aires. The price ran up on these reports. And in view of the amount of Argentine material reaching here several months ago with no takers, domestic producers are keeping their fingers crossed until the reports are confirmed.

Exports can be reported as good, and getting better. Latin America accounts for most of buying. One factor, however, tells of surprising volume being shipped to England. Inquiries and orders are arriving for quantities which would indicate that British business is progressing normally.

South American shipments are expected to increase. Previously domestic producers were called upon "between boats."

Important Price Changes

	Apr. 30	May 31
ADVANCED		
Casein, dom.	$0.10	$0.13
DECLINED		
Flake white, dom.	$0.10¼	$0.08¾
Lead, red, dry	.0787	.0775
Litharge	.0685	.0675

Holland and Belgium were getting goods across, and even Germany was shipping "catch as catch can." But with the two leading suppliers blitzkrieged, Latin countries are turning to U. S. for all replacements. It is felt that the heaviest foreign inventories will be gone this month.

There has been a flurry in metal derivatives based on the needs of the national defense program. It is felt in most quarters, however, that a few months hence will be time enough to worry about that. It will take that long before it begins to reflect in the domestic business picture.

Paint Sales Continue Rise

Combined sales of paint, varnish, lacquer, and fillers during April show an increase over March. Total sales, as reported by 680 manufacturing establishments, were $37,656,398 as compared with $31,592,093 for March, 1940, and $33,999,205 for April, 1939.

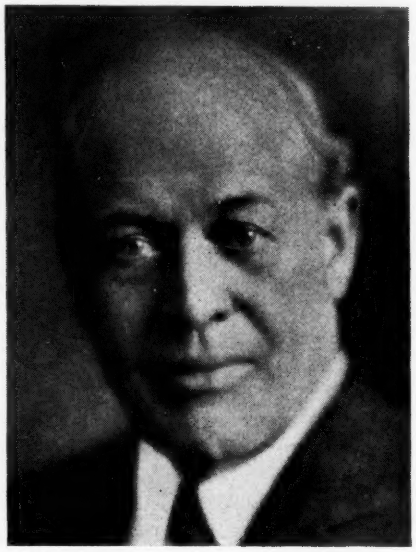
IPCO Neoprene Suit

The protection of employees from corrosive or otherwise hazardous materials is always an important problem. Recently the Industrial Products Co. has introduced a line of protective clothing made of Du Pont Neoprene synthetic rubber.

According to the company these suits stand up in contact with many harmful materials and last longer in all classes of service where rubber was formerly the only means of protection. There is little or no effect on the material from hot or cold oils, gasoline, naphtha, hot or cold caustic soda, tannic acid, muriatic acid. The suits are manufactured in two piece style with all seams vulcanized, in three sizes, and can be had with harness snaps or zipper instead of ball and socket fasteners.

OBITUARIES

General Otto H. Falk, 74, board chairman, Allis-Chalmers Manufacturing Company, died at his Milwaukee home this month. He had been bed-ridden since November, suffering from a heart ailment.



Before turning his well recognized organizing abilities to industry, General Falk had a military career for which his education fitted him.

Most conspicuous work of his industrial career was his reorganization of the old Allis-Chalmers Company into the present Allis-Chalmers Manufacturing Company. General Falk was appointed receiver in 1912, and about a year later was named president.

William Kruger, 51, assistant auditor, Du Pont, died following a heart attack . . . Arthur Bopf, 64, president, Bopf-Whittam Corp., and first producer of lanolin in U. S., died at his Elizabeth, N. J. home . . . Dr. Waldemar Astin, 57, former chief research chemist, Pennsylvania Salt., and president, Peerless Chemical Works, died at his desk following a heart attack . . . Mrs. Julia D. Hummel, 73, wife of Joseph Hummel, Jr., Eagle Picher Lead treasurer, died in Cincinnati.

Edward D. Smith, Jr., 43, president, Independent Manufacturing Company, tallow and fertilizer producers, died after a three months illness . . . James H. Cranwell, 83, manager, Continental Can Baltimore division is dead . . . Willard W. Poole, Mallinckrodt Michigan representative, died in Flint . . . William L. Rollins, fifty year employee, Dodge & Olcott, is dead.

CHEMICAL SPECIALTY *News!*

Agricultural Insecticide & Fungicide Association Charged with Price Fixing—Novel Golf Tourney at N.A.I.D.M.—Company News

AN unlawful price-fixing conspiracy in the sale of chemicals, fertilizers, insecticides, fungicides and related items, is alleged in a complaint issued by the Federal Trade Commission against the Agricultural Insecticide and Fungicide Association, New York, its officers, directors and member companies, and against five cooperating corporations. The five corporations are the Allegheny Chemical Corporation, Reading, Pa.; Ansbacher-Siegle Corporation, Brooklyn, and General Chemical Company, Phelps Dodge Refining Corporation, and Tennessee Corporation, all of New York. Twenty-six respondent association member companies are named.

Association officer respondents are R. N. Chipman, chairman of the board; L. S. Hitchner, president and treasurer, and June C. Heitzman, secretary.

It is alleged in the complaint that on or about October 1, 1936, association members enter into an agreement to restrain competition by agreeing to fix prices, and to cooperate in maintaining this program.

Pursuant to these arrangements, it is alleged, the association acted as a clearing house for exchange of sales and price information submitted by members; association members held regular meetings at which trade policies and prices were established; the association compiled and distributed to members white lists or "Distributor Guides" containing names of dealers to whom to sell on a wholesale basis, and similar lists of dealers to be recognized as retail dealers, and maintained an open price filing system whereby it relayed to the members advance notice of immediate and future price rises and declines.

N.A.I.D.M. Golf Tournament

Highlight of the entertainment program of N. A. I. D. M. convention at Lake Wawasee June 17-19 will be a special golf tournament for "Giants and Pigmies." Contestants will be confined to conventioneers whose height is under 5'5" and taller than 6'1". And none whose score is lower than 59 for 9 holes.

A "mystery" trophy has been donated by J. L. Brenn, Huntington Laboratories. It is, according to Mr. Brenn's report, "something a fellow can use in public and confine to his rumpus room in his house, rather than a trophy a fellow can keep in his office and then pass on to other winners from year to year." More than that no one will know about it until it is presented at the annual association dinner on Tuesday evening, June 18.

Qualifying rounds of 9 holes will be played June 16 and 17, with finals of 18 holes on June 18. Each participant will be required to have all scores, both qualifying and final sworn to and witnessed. Player most closely approximating the medal score selected before the final play by Committee will be declared the winner.

Complete business program for meeting was carried in CHEMICAL INDUSTRIES for May.

Beach Buys Companies

Beach Soap Company, Lawrence, Mass., subsidiary of Cowles Detergent Company, has purchased inventory, trade names, goodwill of George E. Marsh Co., and Lysander Kemp & Sons Corp., from Consolidated Rendering Company. Present Marsh and Kemp brands of soap will be manufactured in Beach plant under direction of C. F. Mudgett, former Marsh plant superintendent.

Eastern sales staff of Marsh, comprising Alfred Cowan, Frank E. Allen, and Fletcher S. Lawson will be added to Beach or Cowles Detergent sales force.

Hecker Products Corp. recently introduced Shinola liquid dressing for children's shoes. Product is said to dry to a shine without brushing. An applicator swab is in the bottle top.

American Can Truck Ads.

American Can Company truck fleet throughout the country last month carried poster advertisements on side panels promoting sale of insecticides. As featured humorous drawing of a moth carrying a pair of scissors and deciding which garment hanging in a closet to attack. Copy read: "Time for Insecticides——Buy a can today." Truck ads will continue to be carried on products packed in cans in program developed by company.

Wright Builds Plant

J. A. Wright & Company, silver polish manufacturer, is building a new plant in Keene, N. H., scheduled to be completed Oct. 1. Building will be 200 x 150 feet, and afford room for installation of modern automatic manufacturing and packing machinery which present quarters would not permit, according to John P. Wright, president and treasurer.

Lighter Drums Authorized

Five-gallon drums made from No. 26 gauge metal for transportation of roofing cement have been authorized by the Consolidated Classification committee as result of a petition filed by the National Paint, Varnish & Lacquer Association. New classification is expected to become effective July 15.

New Water Paint Spec.

Paint manufacturers recently received revised draft of proposed new Federal specification for cold-water emulsified resin-binder paint paste in white and light tints for interior use. Comments and criticism were requested in order that specification may be adopted and promulgated as early as possible.

Hilo Staff Shifts

Hilo Varnish has named William J. Cummings general manager of the Chicago division. William M. Leisen, formerly office manager, has been added to sales force on architectural finishes. Vic Hansen has joined Chicago sales staff to cover wood furniture and metal industries.

Local N.P.V.&L. Elections

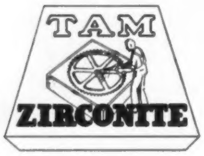
C. Francis Beatty, president, Socony Paint Products Co., was elected 52nd president, New York Paint, Varnish and Lacquer Association at annual meeting.

H. A. Rowland, president, Elliott Paint and Varnish Company, was elected president, Chicago P. V. & L. A.

H. Vernon Smith, technical director, McDougall-Butler Co., is new president, Western N. Y. Paint & Varnish Production Club.

New Trade Marks of the Month

ZIRCONITE
424,415



424,416

HYDRO-CEL
426,292

CELASTRAW
426,326

FLX-M
406,950

Slick
414,347

T'WILL
427,490

WELLAPON
427,523

COCKADE
427,886

CARMAN'S
V.V.-77
425,894

425,932

sun rub
427,778

Dresola
427,964

Biad
428,039

Butisol
428,040

Dymixal
428,041

Ferromin
428,042

Linocid
428,043

Liquoid
428,044

Persals
428,045

Phostomin
428,046

Sorparin
428,050

Tolubane
428,051

Picnic
428,081

426,946

GARLOCK
426,947

LUSTRACAST
426,924

TERVAN
427,600

K 58
426,622

58
426,623

Leverpak
425,914

427,572

Pace
428,017

CALED Pace
428,018

PROTOVAC
425,978

LYONS'
414,665

SMENTOX
424,552

PESTROL
426,178

CELUCOTE
426,288

SANAPEL
426,632

Peroblonde
427,137

GELUSIL
427,151

VAMOOSE
427,292

BYLERIC
427,381

Trade Mark Descriptions †

424,415. The Titanium Alloy Mfg. Co., Niagara Falls, N. Y.; Oct. 10, '39; for foundry mold and core wash. Since Sept. 5, '39.

424,416. The Titanium Alloy Mfg. Co., Niagara Falls, N. Y.; Oct. 10, '39; for foundry mold and core wash. Since Sept. 5, '39.

426,292. The General Tire & Rubber Co., Akron, O.; Dec. 6, '39; for rubber composition for sound deadening and vibration absorption. Since Oct. 5, '39.

426,326. Celanese Corp. of America, N. Y. City; Dec. 7, '39; for synthetic straw. Since Oct. 31, '39.

406,950. Albert M. Taylor (doing business as FLX-M Prods. Co.), Exeter, N. H.; May 31, '38; for oil preparation for purpose of making leather more flexible. Since Mar. 22, '28.

414,347. The Glidden Co., Cleveland, O.; Dec. 30, '38; for cleaning compound for household and industrial use. Since July 5, '35.

427,490. George J. Praechtl, Pine Hill, Buffalo; Jan. 12, '40; for polishes and cleaners. Since Oct. 28, '39.

427,523. The Wella Corp., N. Y. City; Jan. 16, '40; for soap. Since Nov. 1, '39.

427,886. Dorothy Gray Salons, Bloomfield, N. J.; Jan. 26, '40; for lipsticks, dry rouge, and cream rouge. Since Jan. 10, '40.

425,932. Stanley B. Sovatkin (doing business as Ralksite Co.), Brooklyn, N. Y.; Nov. 24, 39; for steel hardening compound. Since Oct. 30, '39.

425,894. Thomas Levin (doing business as Carman's Distributing Co.), Normandy Township, Wellston Post Office, Mo.; Nov. 22, '39; for preparation of carminative stomachic, diuretic and laxative medicine. Since Nov. 15, '39.

427,778. Sun-Rub Products, Inc., East Cleveland, O.; Jan. 23, '40; applicant disclaims the word "Rub" apart from the mark; for Analgesic Lotion or Medicament intended for external use for the relief of pain caused by colds, headaches, muscular congestion. Since Oct. 30, '39.

427,964. Albert E. Cloutier (doing business as Dresso Products), Fall River, Mass.; Jan. 29, '40; for bleach and water softener. Since Jan. 17, '40.

428,039. McNeil Laboratories, Inc., Phila., Pa.; Jan. 30, '40; for vitamin preparation in tablet and capsule form. Since June 1, '39.

428,040. McNeil Labs., Inc., Phila., Pa.; Jan. 30, '40; for barbituric acid derivative having hypnotic, sedative, and antispasmodic properties, in tablet capsule, and elixir form. Since July 8, '37.

428,041. McNeil Laboratories, Inc., Phila., Pa.; Jan. 30, '40; for antiseptic preparation in crystal or powder form particularly useful in the treatment of burns. Since Jan. 27, '38.

428,042. McNeil Laboratories, Inc., Phila., Pa.; Jan. 30, '40; for reconstructive tonic and stimulant in tablet, capsule, and elixir form. Since June 25, '36.

428,043. McNeil Laboratories, Inc., Phila., Pa.; Jan. 30, '40; for vitamin F concentrate in capsule and ointment form, useful in the treatment of asthma and skin affections and as a dietary corrective. Since Sept. 28, '39.

428,044. McNeil Laboratories, Inc., Phila., Pa.; Jan. 30, '40; for castor and olive oil emulsion useful as a laxative. Since Nov. 17, '38.

428,045. McNeil Laboratories, Inc., Phila., Pa.; Jan. 30, '40; for preparation in tablet form useful in restoring salts lost in perspiration. Since Sept. 26, '39.

428,046. McNeil Laboratories, Inc., Phila., Pa.; Jan. 30, '40; for reconstructive tonic and nerve stimulant in elixir form. Since Feb. 17, '37.

428,050. McNeil Laboratories, Inc., Phila., Pa.; Jan. 30, '40; for preparation in tablet and elixir form, useful in the treatment of gall bladder diseases. Since Oct. 5, '37.

428,051. McNeil Laboratories, Inc., Phila., Pa.; Jan. 30, '40; for cough syrup. Since Oct. 14, '37.

428,081. Lentheric, Inc., N. Y. City; Jan. 31, '40; for perfumes. Since Jan. 24, '40.

426,946. The Garlock Packing Company, Palmyra, N. Y.; Jan. 28, '39; for sealing compound for use in connection with gasket and pipe joints. Since Aug. 24, '31.

426,947. The Garlock Packing Co., Palmyra, N. Y.; Dec. 28, '39; under section 5B of the act of 1905 as amended in 1920. Applicant is the owner of Reg. No. 184,261; for sealing compound for use in connection with gasket and pipe joints. Since Aug. 24, '31.

426,924. The Cooper Alloy Foundry Co., Elizabeth, N. J.; Dec. 27, '39; for steel castings. Since Dec. 14, '39.

427,600. Standard Oil Co. of New Jersey, Wilmington, Del.; Jan. 18, '40; for lubricating oils and petroleum waxes. Since Mar. 13, '34 on oils and since Dec. 11, '39 on waxes.

426,622-426,623. Kimble Glass Company, Vineland, N. J.; Dec. 15, '39; for glass funnels for laboratory use. Since Nov. 1, '39.

425,914. The Container Company, Van Wert, O.; Nov. 24, '39; for fiber shipping drums. Since Oct. 24, '39.

427,572. The Bank Box Corp., St. Louis, Mo.; Jan. 18, '40; for supplies and accessories for dry cleaning—namely dry cleaning solvent and spotting fluid. Since Jan., '30.

428,017. Caled Products Company, Inc., Cottage City, Brentwood, Md.; Jan. 30, '40; for detergents—namely soap and soap preparations. Since Jan. 3, '40.

428,018. Caled Products Co., Inc., Cottage City, Brentwood, Md.; Jan. 30, '40; for detergents—namely soap and soap preparations. Since Jan. 3, '40.

425,978. The Borden Company, N. Y. C.; Nov. 27, '39; for glues. Since Sept. 29, '39.

414,665. I. L. Lyons & Co., Ltd., New Orleans, La.; Jan. 10, '39. Under 10 year proviso; for chemicals and drugs. Since 1870.

424,552. National Lead Company, N. Y. City; Oct. 14, '39; for chemical compounds for treating oil well drilling muds. Since Aug. 31, '39.

426,178. Antrol Laboratories, Inc., Los Angeles, Calif.; Dec. 4, '39; for liquid insecticide. Since Nov. 15, '39.

426,288. The Dyment Company, Cleveland, O.; Dec. 6, '39; for liquid coating for paper and paper board. Since Nov. 27, '39.

426,632. Nicholas Salinitro, doing business as Salinitro Laboratories, N. Y. City; Dec. 15, '39; no claim is made to the term "New York"; for chemical preparation for the alleviation of superficial skin irritations. Since Nov. 1, '37.

427,137. The Goodman Chemical Co., N. Y. City; Jan. 4, '40; for bleaching peroxide. Since Aug., '36.

427,151. William R. Warner & Co., Inc., N. Y. City; Jan. 4, '40; for medicinal preparations for the rational control of gastro-intestinal hyperacidity. Since Dec. 22, '39.

427,292. Cadie Chemical Products, Inc., N. Y. City; Jan. 10, '40; for material for killing moths, moth eggs, and moth larvae. Since Mar. 30, '39.

427,381. The Wm. S. Merrell Co., Cincinnati, O.; Jan. 12, '40; for preparation used in the treatment of gall bladder disfunction. Since Jan. 2, '40.

† Trademarks reproduced and described include those appearing in *U. S. Patent Digest*, March 12 to April 2, 1940, inclusive.

TRISICALC
427,332

BETAFORM
427,368

GRAPH-O-LITH
427,433

Trek
427,438

Clocream
427,483

De-luxe
427,550

427,552

Handigas
427,714

CYCLOSUL
427,843

VIO-CAL
428,302

TRANSPLANTONE
425,505

ROTANIUM
427,719

BRUCE
425,877

LAX
427,829

DU PONT
427,623

SURFASOL
424,805

CHLOROSOPE
426,618

VIZZENE
406,731

THIBÉTOLIDE
422,930

Viamineral
424,753

MY KNIGHT
426,343

PEROXIDENT GUM
426,807

TEN-O-FILM
427,926

Ricin-olivate
428,048

LUTOCYLOL
428,202

METANDREN
428,203

PARGRAN
428,593

CLOTIAMINA
428,594

AUDCOLOY
427,953

AEROSOL
428,375

PCA RED MURIATE
427,389

DAVAX
428,109

KING OF THE ROOF
425,356

SEAWATER
416,883

CELCO
427,750

STYRITE
427,887

KM
427,430

BIOPHILE
387,352

SPRAYSOY
414,107

NATIONAL CO-OP COOPERATIVES
421,527

Meridian
424,105

Phthalocine
428,171

(Trade Mark Descriptions Continued)

427,332. Brooklyn Scientific Products Co., Inc., N. Y. City; Jan. 11, '40; for medicinal preparation in tablet form to be used in treatment of gastric disturbances. Since Sept. 1, '39.

427,368. The C. B. Dolge Co., Westport, Conn.; Jan. 12, '40; for insecticides. Since '07.

427,433. Philip A. Hunt Co., N. Y. City; Jan. 13, '40; for chemicals for developing line and half-tone negatives. Since Aug. 1, '39.

427,438. National Carbon Company, Inc., N. Y. City; Jan. 13, '40; for anti-freeze. Since Jan. 3, '40.

427,483. The Upjohn Company, Kalamazoo, Mich.; Jan. 15, '40; for medicinal substance for the promotion of epithelization. Since June 30, '40.

427,550. Monroe Chemical Company, Quincy, Ill.; Jan. 17, '40; for dyes. Since Dec. 27, '39.

427,552. Monroe Chemical Co., Quincy, Ill.; Jan. 17, '40; the representation of the unfolded envelope is disclaimed per se, for dyes. Since Dec. 27, '39.

427,714. Liquified Gas Company, Lima, O.; Jan. 22, '40; for manufactured gas. Since Dec. 4, '39.

427,843. Harris-Seybold-Potter Co., Cleveland, O.; Jan. 25, '40; for chemical preparations used as oxidation inhibitors. Since Jan. 2, '40.

428,302. Burbot Liver Products Co., Baudette, Minn.; Feb. 7, '40; for vitamin and mineral wafers. Since Jan. 17, '40.

425,505. American Chemical Paint Company, Ambler, Pa.; Nov. 10, '39; for plant stimulant. Since Oct. 28, '39.

427,719. Rotometals, Inc., San Francisco, Calif.; Jan. 22, '40; for babbitt metal. Since Aug. 22, '39.

425,877. E. L. Bruce Co., Memphis, Tenn., Nov. 22, '39; for varnish type floor finish, floor polish, and paste floor wax. Since February, '32.

427,829. Acme Chemical Company, Milwaukee, Wisc.; Jan. 25, '40; for floor dressing. Since April 11, '34.

427,623. E. I. du Pont de Nemours & Co., Wilmington, Del.; Jan. 19, '40; for cellulose acetate film, cellulose sponges, ceramic clays, and chalk. Since July 1, '36 on cellulose acetate film; on cellulose sponges since July 1, '36; and on ceramic clays and chalk since Dec. 31, '32.

424,805. Habow Chemicals, Inc., Conover, N. C.; Oct. 23, '39; for jelly soap, soap powder, sweeping compounds, liquid toilet and laundry soap. Since May 1, '39.

426,618. Hardin Chemical Company, Inc., N. Y. C.; Dec. 15, '39; for dry cleaning soap powder for use in synthetic solvents in the dry cleaning of fabrics. Since Sept. 8, '39.

406,731. The Reliance Gauge Column Company, Cleveland, O.; May 25, '38; for filling-liquids for liquid level gauge instruments. Since Sept. 10, '36.

422,930. L. Givaudan & Cie. Société Anonyme, Vernier, Switzerland; Aug. 24, '39; for perfumery and beauty preparations—namely, powders, creams, liquids, pastes, pomades, and cosmetics for the care of the skin, hair, and teeth. Since Feb. 8, '39.

424,753. Paul S. Casey (doing business as Vitamineral Products Co.), Peoria, Ill.; Oct. 20, '39; the term "Mineral" is disclaimed apart from the mark; for compound containing various minerals to be mixed with feed rations of animals for purpose of correcting and preventing feed deficiencies. Since April 1, '21.

426,343. Purex Products, Inc., Baltimore, Md.; Dec. 7, '39; for chemicals and drugs; since May 18, '37.

426,807. Gum Laboratories, Inc., Clifton Heights, Pa.; Dec. 21, '39; no claim is made to the word "Gum" except as shown; for gum containing a non-poisonous peroxide compound adapted to whiten the teeth. Since Nov. 20, '39.

427,926. Corn Products Refining Co., N. Y.; Jan. 27, '40; no claim is made to the term "Film" apart from the mark; for beater starch for paper manufacturing. Since Jan. 14, '40.

428,048. McNeil Laboratories, Inc., Phila., Pa.; Jan. 30, '40; no claim is made to the word "Ricin" apart from the mark; for mixture of castor and olive oils, in capsule and emulsion form. Since Aug. 3, '39.

428,202. Society of Chemical Industry in Basle, Basel, Switzerland; Feb. 3, '40; for female sex hormone. Since Nov. 2, '39.

428,203. Society of Chemical Industry in Basle, Basel, Switzerland; Feb. 3, '40; for male sex hormone. Since Nov. 20, '39.

428,593. E. R. Squibb & Sons, N. Y. City; Feb. 15, '40; for vitaminic preparations. Since Dec. 16, '39.

428,594. E. R. Squibb & Sons, N. Y. City; Feb. 15, '40; for vitaminic preparations. Since Dec. 16, '39.

427,953. Audley Engineering Co., Ltd., Newport, Eng.; Jan. 29, '40; for cast iron alloys. Since July 13, '39.

428,375. American Cyanamid & Chemical Corp., N. Y. City; Feb. 9, '40; for wetting agents. Since Aug. 20, '37.

427,389. Potash Company of America, Baltimore, Md., Atlanta, Ga., and Carlsbad, N. Mex.; Jan. 12, '40; no claim is made to the words "Red Muriate" apart from the mark for muriate of potash. Since Oct. 15, '37.

428,109. The Davies-Young Soap Co., Dayton, O.; Feb. 1, '40; for prepared liquid wax. Since Jan. 20, '40.

425,356. Mobile Paint Manufacturing Co. of Delaware, Inc., Wilmington, Del., and Mobile, Ala.; Nov. 7, '39; for liquid roof coating with asbestos fibre and asphalt base and plastic roofing cement. Since Oct. 7, '31.

416,883. Westvaco Chlorine Products Corp., N. Y. City; Mar. 9, '39; for raw or calcined magnesia compounds. Since Feb. 16, '39.

427,750. C. E. L. Co., Inc., N. Y. City; Jan. 23, '40; for chemical composition to be added to gasoline, fuel oil, etc. for improving the efficiency of internal combustion engines, to be added to lubricating oil to improve the lubricating qualities thereof, and as a carbon removal treatment for the cylinders of internal combustion engines. Since Jan. 11, '40.

427,887. The Dow Chemical Co., Midland, Mich.; Jan. 26, '40; for polymerized styrene. Since Nov. 9, '39.

427,430. National Home Products, Inc., N. Y. City; Jan. 13, '40; for washing powder. Since Jan. 10, '39.

387,352. Sharp and Dohme, Inc., Phila., Pa.; Dec. 31, '36; for biologically active substances of animal and vegetable origin for human and veterinary use. Since Nov. 5, '36.

414,107. The Glidden Company, Cleveland, O.; Dec. 22, '38; for adhesive agent and emulsification agent for parasiticides such as insecticides, fungicides, and plant bactericides. Since Jan. 31, '38.

421,527. National Co-Operatives, Inc., Chicago, Ill., and Indianapolis, Ind.; July 13, '39. Under the act of February 20, '05, as amended June 10, '38; for pharmaceuticals, drugs and cosmetics. Since Dec., '29.

424,105. Spiegel, Inc., Chicago, Ill.; Sept. 30, '39; for pharmaceuticals and drugs. Since Sept. 1, '39.

428,171. Reichhold Chemicals, Inc., Detroit and Ferndale Stations, Detroit, Mich.; Feb. 2, '40; for toners and lakes for use in ink pigments. Since Feb. 10, '40.

KOPPERS

TAR ACIDS
Phenol · Cresol
Cresylic Acid

TAR ACID OILS

KOPPERS CHEMICALS AND SOLVENTS
Benzol (all grades) . . . Toluol (Industrial and Nitration) . . . Xylol (10° and Industrial) . . . Solvent Naphtha (Including High Flash) . . . Naphthalene . . . Shingle Stain Oil . . . Refined Tars . . . Pitch Coke . . . Industrial Coal Tar Pitches . . . Flotation Oils . . . Creosote

OTHER KOPPERS PRODUCTS
Coal Tar Roofing Materials . . . Waterproofing and Dampproofing Materials . . . Tarmac Road Tar Materials . . . Bituminous Base Paints . . . Coal . . . Coke . . . Benzol Recovery Plants . . . Naphthalene Removal Apparatus . . . Sulphur Recovery Apparatus . . . Phenol Removal Apparatus . . . By-Product Recovery Apparatus . . . Fast's Self-aligning Couplings . . . Piston Rings . . . Valves . . . Pressure-treated Lumber

PHENOL—All standard grades such as 82% and 90% and 39° Melting Point Pure.

CRESOL—U.S.P. with very close cut distillation range and light color, for pharmaceutical purposes—Meta-Para Cresol with high meta cresol content—Resin cresols close cut to wide boiling with guaranteed meta cresol contents and clean odor.

CRESYLIC ACID—Many distillation ranges appropriate for all established uses—pale color—clean odor—total impurities besides water not exceeding one half of one percent.

TAR ACID OILS—Frozen crystal free at 0°C.—good emulsion-forming properties—low bensophenol content—appropriate for low to high coefficiencies with tar acid contents as required.

KOPPERS COMPANY · PITTSBURGH, PA.

SYNTHETIC RESINS
ANTISEPTICS
DRUGS
DISINFECTANTS
PLASTICIZERS
DYES
SOLVENTS
EXPLOSIVES
PERFUMES
PHOTOGRAPHIC DEVELOPERS
SOAP
RUBBER RECLAIMING AGENTS
LACQUER
ANTI-OXIDANTS
OIL PURIFICATION
ANIMAL DIPS
INEXPENSIVE DISINFECTANTS
FLOTATION PROCESSES
INSECTICIDES

ABC

FORMALDEHYDE

U. S. P.

Manufactured by Kay-Fries Chemicals, Inc.

Tank Cars | **Drums** | **Carboys**

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180 MADISON AVE., NEW YORK, N.Y.

Heavy Chemicals, Coal-Tar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Petroleum Solvents and Chemicals, Naval Stores, Fats and Oils, etc.

PRICES CURRENT

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f.o.b. works are specified as such. Import chemicals are so designated.

Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f.o.b., or ex-dock. Materials sold f.o.b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both.

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1939 Average $1.24 - Jan. 1940 $1.17 - May 1940 $1.19

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Acetaldehyde, drs, c-l, wks lb.	...	.11	...	.11	.10	.14
Acetaldol, 95%, 50 gal drs wks lb.	.21	.25	.21	.25	.21	.25
Acetamide, tech, lcl, kgs lb.	.28	.50	.28	.50	.28	.50
Acetanilid, tech, 150 lb bbls lb.	...	.22	...	.22	.22	.29
Acetic Anhydride, drs, f.o.b. wks, frt all'd lb.	.10½	.11½	.10½	.11½	.10½	.11
Acetin, tech, drs lb.	...	.33	...	.33	...	.33
Acetone, tks, f.o.b. wks, frt all'd lb.	...	.06	.05¾	.06	.04¼	.06
drs, c-l, f.o.b. wks, frt all'd' lb.	...	.07½	.07¼	.07½	.05¾	.07¼
Acetyl chloride, 100 lb cbys lb.	.55	.68	.55	.68	.55	.68
ACIDS						
Abietic, kgs, bbls lb.	.08¾	.09	.08¾	.09	.08¾	.09
Acetic, 28%, 400 lb bbls,						
c-l, wks 100 lbs.	...	2.23	...	2.23	...	2.23
glacial, bbls, c-l, wks 100 lbs.	...	7.62	...	7.62	...	7.62
glacial, USP bbls, c-l, wks, 100 lbs.	...	10.25	...	10.25	...	10.25
Acetylsalicylic, USP, 225 lb bbls lb.	...	.40	...	.40	.40	.50
Adipic, kgs, bbls lb.	...	.31	.31	.72	...	.72
Anthranilic, ref'd, bbls lb.	1.15	1.20	1.15	1.20	1.15	1.20
tech bbls lb.	...	.75	...	.75	...	.75
Ascorbic, bot oz.	2.25	2.50	2.25	3.00	2.75	3.25
Battery, cbys, wks 100 lbs.	1.60	2.55	1.60	2.55	1.60	2.55
Benzoic tech, 100 lb kgs lb.	.43	.47	.43	.47	.43	.47
USP, 100 lb kgs lb.	.54	.59	.54	.59	.54	.59
Boric, tech, gran, 80 tons, bgs, delv ton *a*	...	96.00	...	96.00	...	96.00
Broenner's, bbls lb.	...	1.11	...	1.11	...	1.11
Butyric, edible, c-l, wks, cbys lb.	1.20	1.30	1.20	1.30	1.20	1.30
synthetic, c-l, drs, wks lb.	...	.22	...	.22	...	.22
wks, lcl lb.	...	.23	...	.23	...	.23
tks, wks lb.	...	.21	...	.21	...	.21
Camphoric, drs lb.	5.50	5.70	5.50	5.70	5.50	5.70
Caproic, normal, drs lb.	.35	.40	.35	.40	...	.35
Chicago, bbls lb.	...	2.10	...	2.10	...	2.10
Chlorosulfonic, 1500 lb drs, wks lb.	.03½	.05	.03½	.05	.03½	.05
Chromic, 99¾%, drs, delv lb.	.15¼	.17¼	.15¼	.17¼	.15¼	.17¼
Citric, USP, crys, 230 lb bbls lb. *b*	.20	.21½	.20	.21½	.20	.22½
anhyd, gran bbls lb *b*	...	.23	...	.23	.23	.25
Cleve's, 250 lb bbls lb.	...	.57	...	.57	...	.57
Cresylic, 99%, straw, HB, drs, wks, frt equal gal.	.68	.70	.68	.70	.49	.70
99%, straw, LB, drs, wks, frt equal gal.	.68	.75	.68	.75	.55	.75
resin grade, drs, wks, frt equal lb.	.08¾	.09¾	.08¾	.09¾	.08¼	.09¾
Crotonic, bbls, delv lb.	.21	.50	.21	.50	.21	.50
Formic, tech, 140 lb drs lb.	.10½	.11½	.10½	.11½	.10½	.11½
Fumaric, bbls lb.	.24	.28	.24	.75	...	.75
Fuming, see Sulfuric (Oleum)						
Gallic, tech, bbls lb.	.90	.93	.75	.93	.70	.73
USP, bbls lb.	.92	.95	.92	.95	.77	.81
Gamma, 225 lb bbls, wks lb.	...	.85	...	.85	...	.85
H, 225 lb bbls, wks lb.	...	.45	...	.45	.50	.55
Hydriodic, USP, 47% lb.	...	2.30	...	2.30	...	2.30
Hydrobromic, 34% conct 155 lb cbys, wks lb.	.42	.44	.42	.44	.42	.44
Hydrochloric, see muriatic						
Hydrocyanic, cyl, wks lb.	.80	1.00	.80	1.00	.80	1.30
Hydrofluoric, 30%, 400 lb bbls, wks lb.	.06	.06½	.06	.06½	.06	.07½
Hydrofluosilicic, 35%, 400 bbls, wks lb.	.09	.09¼	.09	.09½	.09	.09½
Lactic, 22%, dark, 500 lb bbls lb.	.02½	.03¾	.02½	.03¾	.02½	.02¾
22%, light ref'd, bbls lb.	.03½	.03¾	.03½	.03¾	.03½	.03¾
44%, light, 500 lb bbls lb.	.05½	.06¾	.05½	.06¾	.05½	.05¾
44%, dark, 500 lb bbls lb.	.06½	.07¾	.06½	.07¾	.06½	.06¾
50%, water white, 500 lb bbls lb.	.10½	.11½	.10½	.11½	.10½	.11½
USP X, 85%, cbys lb.	.43	.45	.42	.45	.42	.45
Lauric, drs lb.	.13½	.14	.13½	.14½	.11¾	.12¼
Laurent's, 250 lb bbls lb.	...	.45	.45	.46	.45	.46
Maleic, powd, kgs lb.	...	.30	.30	.40	.30	.40
Malic, powd, kgs lb.	...	.47	...	.47	.45	.60
Metanillic, 250 lb bbls lb.	.60	.65	.60	.65	.60	.65
Mixed, tks, wks N unit	.05	.06	.05	.07¼	.06½	.07¼
S unit	.008	.009	.008	.009	.008	.009
Monochloracetic, tech, bbls lb.	.15	.18	.15	.18	.16	.18
Monosulfonic, bbls lb.	...	1.50	1.50	1.60	1.50	1.60

a Powdered boric acid $5 a ton higher in each case; USP $15 higher; *b* Powdered citric is ½c higher; kegs are in each case ½c higher than bbls.; *y* Price given is per gal.

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Muriatic, 18°, 120 lb cbys,						
c-l, wks 100 lb.	...	1.50	...	1.50	...	1.50
tks, wks 100 lb.	...	1.05	1.00	1.05	...	1.00
20°, cbys, c-l, wks 100 lb.	...	1.75	...	1.75	...	1.75
tks, wks 100 lb.	...	1.15	1.10	1.15	...	1.10
22°, c-l, cbys, wks 100 lb.	...	2.25	...	2.25	...	2.25
tks, wks 100 lb.	...	1.65	1.60	1.65	...	1.60
CP, cbys lb.	.06½	.08	.06½	.08	.06½	.07½
N & W, 250 lb bbls lb.	.85	.87	.85	.87	.85	.87
Naphthenic, 240-280 s.v., drs lb.	.10	nom.	nom.	.14	.10	.14
Naphthionic, tech, 250 lb bbls lb.	.60	.65	.60	.65	.60	.65
Nitric, 36°, 135 lb cbys, c-l, wks 100 lb. *c*	...	5.00	...	5.00	...	5.00
38°, c-l, cbys, wks 100 lb. *c*	...	5.50	...	5.50	...	5.50
40°, cbys, c-l, wks 100 lb. *c*	...	6.00	...	6.00	...	6.00
42°, c-l, cbys, wks 100 lb. *c*	...	6.50	...	6.50	...	6.50
CP, cbys, delv lb.	.11½	.12½	.11½	.12½	11½	.12½
Oxalic, 300 lb bbls, wks, or N Y lb.	.10¾	.12	.10¾	.12	.10¾	.12
Phosphoric, 85%, USP, cbys lb.	...	.12	.12	.14	.12	.14
50%, acid, c-l, drs, wks lb.	...	.12	.06	.12	.06	.08
75%, acid, c-l, drs, wks lb.	...	.07½	...	.07½	...	.07½
Picramic, 300 lb bbls, wks lb.	.65	.70	.65	.70	.65	.70
Picric, kgs, wks lb.	...	.35	.35	.40	.35	.40
Propionic, 98% wks, drs lb.	...	.25	...	.25	...	.22
80% lb.	...	.20	...	.20	.16	.17½
Pyrogallic, tech, lump, pwd, bbls lb.	...	1.20	1.05	1.20	1.45	1.63
cryst, USP lb.	1.70	2.25	1.55	2.25	1.55	2.10
Ricinoleic, bbls lb.	.27	.33	.27	.33	...	.35
tech, bbls lb.	...	.13	...	.13	...	.13
Salicylic, tech, 125 lb bbls, wks lb.	...	.33	...	.33	...	.33
USP, bbls lb.	.35	.40	.35	.40	.35	.40
Sebacic, tech, drs, wks lb.	no prices		no prices		...	...
Succinic, bbls lb.	...	.75	...	.75	...	.75
Sulfanilic, 250 lb bbls, wks lb.	...	.17	.17	.18	.17	.18
Sulfuric, 60°, tks, wks ton	...	13.00	...	13.00	...	13.00
c-l, cbys, wks 100 lb.	...	1.25	...	1.25	...	1.25
66°, tks, wks ton	...	16.50	...	16.50	...	16.50
c-l, cbys, wks 100 lb.	...	1:50	...	1.50	...	1.50
CP, cbys, wks lb.	.06½	.08	.06½	.08	.06½	.07½
Fuming (Oleum) 20% tks, wks ton	...	18.50	...	18.50	...	18.50
Tannic, tech, 300 lb bbls lb.	.54	.56	.44	.56	.40	.47
Tartaric, USP, gran, powd, 300 lb bbls lb.	.39¼	.39¾	.35¼	.39¾	.27½	.31¼
Tobias, 250 lb bbls lb.	.55	.60	.55	.60	.55	.67
Trichloroacetic bottles lb.	2.00	2.50	2.00	2.50	2.00	2.50
kgs lb.	...	1.75	...	1.75	...	1.75
Tungstic, tech, bbls lb.	no prices		no prices		1.70	1.80
Vanadic, drs, wks lb.	no prices		no prices		1.10	1.20
Albumen, light flake, 225 lb. bbls lb.	.55	.62	.55	.62	.52	.68
dark, bbls lb.	.13	.18	.13	.18	.13	.18
egg, edible lb.	.54	.60	.53	.62	.58	.78
ALCOHOLS						
Alcohol, Amyl (from Pentane)						
tks, delv lb.	...	.101	...	.101	...	.101
c-l, drs, delv lb.	...	.111	...	.111	...	.111
lcl, drs, delv lb.	...	.121	...	.121	...	.121
Amyl, normal l-c-l drs	...	.08½	...	.08½	...	.08½
Wyandotte, Mich. lb.	...	.25	...	...	...	...
secondary, tks, delv lb.						
drs, c-l., delv E of Rockies lb.	...	.09½		09½		.09½
Benzyl, cans lb.	...	.68	.68	1.00	.68	1.00
Butyl, normal, tks, f.o.b. wks, frt all'd lb. *d*	...	.09	...	.09	.07	.09
c-l, drs, f.o.b. wks, frt all'd lb. *d*	...	.10	...	.10	.08	.10
Butyl, secondary, tks, delv lb. *d*	...	.06½	...	.06½	.05½	.06½
c-l, drs, delv lb. *d*	...	.07½	...	.07½	.06½	.07½
Capryl, drs, tech, wks lb.	...	.85	...	.85	...	.85
Cinnamic, bottles lb.	2.00	2.50	2.00	2.50	2.00	2.50
Denatured, CD, 14, c-l drs, wks gal. *e*	.31½	.36½	.31½	.36½	.27½	.36½
tks, East, wks gal.	...	.25½	...	.25½	.21½	.25½
Western schedule, c-l.						
drs, wks gal. *e*	...	.36½	.34½	.36½	.34½	.37
c-l, drs, wks gal. *e*	...	.26½	.21½	.26½	.19½	.22
Denatured, SD, No. 1, tks,	...	.22½	...	.22½	.25½	28½

c Yellow grades 25c per 100 lbs. less in each case; *d* Spot prices are 1c higher; *e* Anhydrous is 5c higher in each case; *f* Pure prices are 1c higher in each case.

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.

Prices Current

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Alcohols (continued):						
Diacetone, pure, c-l, drs, delv ....lb. *f*	...	.12	...	.12	.09	.12
tech, contract, drs, c-l, delv ....lb.	...	.11½	...	.11½	.08½	.11½
Ethyl, 190 proof, molasses, tks ....gal. *g*	...	4.48	...	4.48	4.46	4.48½
c-l, drs ....gal. *g*	...	4.54	...	4.54	4.49	4.54½
c-l, bbls ....gal. *g*	...	4.55	...	4.55	4.53	4.55½
Furfuryl, tech, 500 lb drs lb.	...	.35	.25	.35	.25	.35
Hexyl, secondary tks, delv lb.	...	.12	...	.12	...	.12
c-l, drs, delv ....lb.	...	.13	...	.13		.13
Normal, drs, wks ...lb.	3.25	3.50	3.25	3.50	3.25	3.50
Isoamyl, prim, cans, wks lb.	...	.32	...	.32	...	.32
drs, lcl, delv ....lb.	...	.27	...	.27	...	.27
Isobutyl, ref'd, lcl, drs..lb.	...	.073	...	.073	.073	.09
c-l, drs ....lb.	...	.069	...	.069	.068	.08½
tks ....lb.	...	.059	...	.059	...	.07½
Isopropyl, refd, 91%, c-l, drs, f.o.b. wks, frt all'd ....lb.	...	.65	...	.65	...	.36
Ref'd 98%, drs, f.o.b. wks, frt all'd ....gal.	...	.65	...	.65	...	.41
Tech 91% drs, above terms ....gal.	...	.33½	...	.33½	...	.33½
tks, same terms...gal.	...	.28½	...	.28½	...	.28½
Tech 98%, drs, above terms ....gal.	...	.36	.36	.37½	...	.37½
tks, above terms...gal.	...	.31	.31	.32½	...	.32½
Spec. Solvent, tks, wks gal.	...	.23½	...	.23½	.19	.23½
Aldehyde ammonia, 100 gal drs ....lb.	.80	.82	.80	.82	.80	.82
Aldehyde Bisulfite, bbls, delv ....lb.	...	.17	...	.17	...	.17
Aldol, 95%, 55 and 110 gal, drs, delv ....lb.	.11	.12	.11	.12	.11	.20
Alphanaphthol, crude, 300 lb bbls ....lb.	...	.52	...	.52	...	.52
Alphanaphthylamine, 350 lb bbls ....lb.	...	.32	.32	.34	.32	.34
Alum, ammonia, lump, c-l, bbls, wks ....100 lb.	...	3.75	...	3.75	3.40	3.75
delv NY, Phila ...100 lb.	...	3.75	...	3.75	3.40	3.75
Granular, c-l, bbls wks ....100 lb.	...	3.50	...	3.50	3.15	3.50
Powd, c-l, bbls, wks 100 lb.	...	3.90	...	3.90	3.55	3.90
Chrome, bbls ....100 lb.	6.50	6.75	6.50	6.75	6.50	6.75
Potash, lump, c-l, bbls, wks ....100 lbs.	...	4.00	...	4.00	3.65	4.00
Granular, c-l, bbls, wks ....100 lb.	...	3.75	...	3.75	3.40	3.75
Powd, c-l, bbls, wks 100 lb.	...	4.15	...	4.15	3.80	4.15
Soda, bbls, wks ....100 lb.	...	3.25	...	3.25	...	3.25
Aluminum metal, c-l, NY 100 lb.	...	19.00	19.00	20.00	...	20.00
Acetate, 20%, bbls ...lb.	.08	.09	.07½	.09	.07½	.09
Basic powd, bbls, delv lb.	.35	.50	.35	.50	.40	.50
Chloride anhyd, 99% wks lb.	.08	.12	.08	.12	.06	.12
93%, wks ....lb.	.05	.08	.05	.08	.05	.08
Crystals, c-l, drs, wks lb.	.06	.06½	.06	.06½	.06	.06¼
Solution, drs, wks ...lb.	.02¾	.03¼	.02¾	.03¼	.02¾	.03¼
Formate, 30% sol bbls, c-l, delv ....lb.	...	.13	...	.13	...	.13
Hydrate, 96%, light, 90 lb bbls, delv ....lb.	.12½	.13½	.12½	.13½	.11½	.13
heavy, bbls, wks ....lb.	.029	.03½	.029	.03½	.029	.03½
Oleate, drs ....lb.	.17½	.20	.16¾	.20	.16¾	.18½
Palmitate, bbls ....lb.	.20½	.21½	.20½	.24½	.23	.24½
Resinate, pp., bbls ....lb.	...	.15	...	.15	...	.15
Stearate, 100 lb bbls ...lb.	.19	.20	.19	.20	.16	.22½
Sulfate, com, c-l, bgs, wks ....100 lb.	...	1.15	...	1.15	...	1.15
c-l, bbls, wks ....100 lb.	...	1.35	...	1.35	...	1.35
Sulfate, iron-free, c-l, bags, wks ....100 lb.	...	1.60	1.60	1.80	...	1.45
c-l, bbls, wks ....100 lb.	...	1.80	1.65	1.80	...	1.65
Aminoazobenzene, 110 lb kgs lb.	...	1.15	...	1.15	...	1.15
Ammonia anhyd fert com, tks lb.	.04½	.05½	.04½	.05½	.04½	.05½
Ammonia anhyd, 100 lb cyl lb.	...	.16	...	.16	...	.16
50 lb cyl ....lb.	...	.22	...	.22	...	.22
26°, 800 lb drs, delv ..lb.	.02¼	.02½	.02¼	.02½	.02¼	.02½
Aqua 26°, tks, NH..cont.	...	.04z	...	.04z	...	.04z
Ammonium Acetate, kgs ..lb.	.27	.33	.27	.33	.26	.33
Bicarbonate, bbls, f.o.b. wks ....100 lb.	...	5.56	...	5.56	5.15	5.71
Bifluoride, 300 lb bbls ..lb.	.14½	.16½	.14½	.16½	.14½	.16½
Carbonate, tech, 500 lb bbls ....lb.	.08	.11	.08	.11	.08	.12
Chloride, White, 100 lb bbls, wks ....100 lb.	4.45	...	4.45	4.90	4.45	4.90
Gray, 250 lb. bbls, wks ....100 lb.	5.50	5.75	5.50	6.25	5.50	6.25
Lump, 500 lb cks spot lb.	.10½	.11	.10½	.11	.10½	.11
Lactate, 500 lb bbls....lb.	.15	.16	.15	.16	.15	.16
Laurate, bbls ....lb.	...	.23	...	.23	...	.23
Linoleate, 80% anhyd, bbls ....lb.	...	.12	...	.12	.11	.15
Naphthenate, bbls ....lb	...	.17	...	.17	...	.17
Nitrate, tech, bbls ....lb.	...	.0455	...	.0455	.036	.0455
Oleate, drs ....lb.	...	.14	...	.14	.11	.14
Oxalate, neut, cryst, powd, bbls ....lb.	.19	.20	.19	.20	.19	.20
Perchlorate, kgs ....lb.	.17	.19	.17	.19	...	.16
Persulfate, 112 lb kgs..lb.	.21	.22	.21	.22	.21	.24
Phosphate, diabasic tech, powd, 325 lb bbls ...lb.	.07½	.10	.07½	.10	.07½	.10
Ricinoleate, bbls ....lb.	...	.15	...	.15	...	.15
Stearate, anhyd, bbls...lb.	...	.24½	...	.24½	.22	.24½
Paste, bbls ....lb.	...	.06½	...	.06½	.06½	.08

g Grain alcohol 25c a gal. higher in each case. ** On a delv. basis.
s On a f.o.b. wks. basis.

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Ammonium (continued):						
Sulfate, dom, f.o.b., bulk ton	...	28.00	...	28.00	27.00	28.00
Sulfocyanide, pure, kgs..lb.	...	.65	...	.65	.55	.65
Amyl Acetate (from pentane) tks, delv ....lb.	...	.095	...	.095	.095	.10
c-l, drs, delv ....lb.	...	.105	...	.105	.105	.11
lcl, drs, delv ....lb.	...	.115	...	.115	.115	.112
tech drs, delv ....lb.	...	.12½	...	.12½	.10½	.12½
Secondary, tks, delv..lb.	...	.08½	...	.08½	...	.08½
c-l, drs, delv ....lb.	...	.09½	...	.09½	...	.09½
tks, delv ....lb.	...	.08½	...	.08½	...	.08½
Chloride, norm, drs, wks lb.	.56	.68	.56	.68	.56	.68
mixed, drs, wks ....lb.	.0565	.0665	.0565	.0665	.0565	.077
tks, wks ....lb.	...	.0465	...	.0465	.0465	.06
Mercaptan, drs, wks....lb.	...	1.10	...	1.10	...	1.10
Oleate, lcl, wks, drs..lb.	...	.25	...	.25	...	.25
Stearate, lcl, wks, drs..lb.	...	.26	...	.26	...	.26
Amylene, drs, wks ....lb.	.102	.11	.102	.11	.102	.11
tks, wks ....lb.	...	.09	...	.09	...	.09
Aniline Oil, 960 lb drs and tks ....lb.	...	.14½	...	.14½	.14½	.17½
Annatto fine ....lb.	.34	.39	.34	.39	.34	.39
Anthracene, 80% ....lb.	...	.55	...	.55	.55	.75
Anthraquinone, sublimed, 125 lb bbls ....lb.	...	.65	...	.65	...	.65
Antimony metal slabs, ton lots ....lb.	...	.14	...	.14	.11¼	.14
Butter of, see Chloride.						
Chloride, soln, cbys ...lb.	...	.17	...	.17	...	.17
Needle, powd, bbls ....lb.	...	.18	...	.18	.12	.20
Oxide, 500 lb bbls ....lb.	...	.15¾	...	.15¾	.10	.15¾
Salt, 63% to 65%, tins lb.	.42	nom.	.42	nom.	.25¾	.42
Archil, conc, 600 lb bbls .lb.	no prices		no prices		.21	.27
Double, 600 lb bbls ....lb.	no prices		no prices		.18	.20
Aroclors, wks ....lb.	.18	.30	.18	.30	.18	.30
Arrowroot, bbls ....lb.	.09	.09½	.09	.10	.08½	.09
Arsenic, Metal ....lb.	...	...	...	...	.40	.60
Red, 224 lb cs kgs ....lb.	.17½	.18	.17½	.18	.18	.19
White, 112 lb kgs ....lb.	.03	.03¾	.03	.03¾	.03	.03¾

B

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Barium Carbonate precip, 200 lb bgs, wks ....ton	52.50	62.50	52.50	62.50	52.50	62.50
Nat (witherite) 90% gr, c-l, wks, bgs ....ton	45.00	47.00	45.00	47.00	41.00	47.00
Chlorate, 112 lb kgs, NY lb.	.20	.22	.20	.22	.16½	.25
Chloride, 600 lb bbls, delv, zone 1 ....ton	77.00	92.00	77.00	92.00	77.00	92.00
Dioxide, 88%, 690 lb drs lb.		.10	.10	.12	.11	.12
Hydrate, 500 lb bbls ...lb.	.06½	.07	.06½	.07	.04½	.05½
Nitrate, bbls ....lb.	.09½	.10½	.09½	.10½	.06¾	.10½
Barytes, floated, 350 lb bbls c-l, wks ....ton	...	25.15	...	25.15	...	23.65
Bauxite, bulk, mines ....ton	7.00	10.00	7.00	10.00	7.00	10.00
Bentonite, c-l, 325 mesh, bgs, wks ....ton	...	16.00	...	16.00	...	16.00
200 mesh ....ton	...	11.00	...	11.00	...	11.00
Benzaldehyde, tech, 945 lb. drs, wks ....lb.	.55	.60	.55	.60	.60	.62
Benzene (Benzol), 90%, Ind. 8000 gal tks, ft all'd gal.	...	.16	...	.16	...	.16
90% c-l, drs ....gal.	...	.21	...	.21	...	.21
Ind pure, tks, frt all'd gal.	...	.16	...	.16	...	.16
Benzidine Base, dry, 250 lb bbls ....lb.	...	.70	...	.70	.70	.72
Benzoyl Chloride, 500 lb drs lb.	.23	.28	.23	.28	.40	.45
Benzyl Chloride, 95-97% rfd, drs ....lb.	.19	.21	.19	.21	.30	.40
Beta-Naphthol, 250 lb bbls, wks ....lb.	.23	.24	.23	.24	.23	.24
Naphthylamine, sublimed, 200 lb bbls ....lb.	1.25	1.35	1.25	1.35	1.25	1.35
Tech, 200 lb bbls ....lb.	.51	.52	.51	.52	.51	.52
Bismuth metal ....lb.	...	1.25	...	1.25	1.05	1.25
Chloride, boxes ....lb.	3.20	3.25	3.20	3.25	3.20	3.25
Hydroxide, boxes ....lb.	3.35	3.46	3.35	3.46	3.15	3.40
Oxychloride, boxes ....lb.	...	3.10	...	3.10	2.95	3.10
Subbenzoate, boxes ....lb.	...	3.36	3.25	3.36	3.25	3.30
Subcarbonate, kgs ....lb.	1.73	1.76	1.73	1.76	1.43	1.76
Trioxide, powd, boxes...lb.	...	3.56	3.56	3.57	...	3.57
Subnitrate, fibre, drs....lb.	1.48	1.51	1.48	1.51	1.23	1.51
Blanc Fixe, 400 lb bbls, wks ton *h*	35.00	42.50	50.00	80.00	40.00	80.00
Beaching Powder, 800 lb drs, c-l, wks, contract 100 lb.	...	2.00	...	2.00	...	2.00
lcl, drs, wks ....lb.	2.25	3.35	2.25	3.35	2.25	3.60
Blood, dried, f.o.b., NY unit	...	2.75	2.75	3.35	2.50	4.25
Chicago, high grade...unit	...	2.75	2.75	3.50	2.30	4.25
Imported shipt ....unit	...	2.60	2.75	3.30	2.65	3.90
Blues, Bronze Chinese						
Prussian Soluble ....lb.	.36	.37	.33	.37	.33	.37
Milori, bbls ....lb.	.33	.34	.33	.34	.33	.37
Ultramarine,* dry, wks, bbls ....lb.	...	.11	...	.11	...	.11
Regular grade, group 1 lb.	...	.16	...	.16	...	.16
Special, group 1 ....lb.	...	.19	...	.19	...	.19
Pulp, No. 1 ....lb.	.22	.27	.22	.27	...	.27
Bone, 4½ + 50% raw, Chicago ....ton	32.00	33.00	32.00	33.00	27.00	35.00
Bone Ash, 100 lb kgs....lb.	.06	.07	.06	.07	.06	.07
Meal, 3% & 50%, imp ton	...	32.50	32.00	32.50	22.00	32.00
Domestic, bgs, Chicago ton	...	30.00	30.00	32.00	24.00	32.00
Borax, tech, gran, 80 ton lots, sacks, delv ....ton *i*	...	43.00	...	43.00	...	43.00
bbls, delv ....ton *i*	...	53.00	...	53.00	...	53.00

h Lowest price is for pulp, highest for high grade precipitated; *i* Crystals $6 per ton higher; USP, $15 higher in each case; *Freight is equalized in each case with nearest producing point.

Prices Current

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Borax (continued)						
Tech, powd, 80 ton lots, sacks ... ton i	...	48.00	47.00	48.00	...	47.00
bbs, delv ... ton i	...	58.00	57.00	58.00	...	57.00
Bordeaux Mixture, drs ... lb.	.11	.11½	.11	.11½	.11	.11½
Bromine, cases ... lb.	.30	.35	.30	.43	.30	.43
Bronze, Al, pwd, 300 lb drs lb.	...	.57	...	.57	.90½	.92½
Gold, blk ... lb.	.60	.65	.60	.65	.45	.65
Butanes, com 16-32° group 3 tks ... lb.	.02½	.03	.02¼	.03¾	.02¼	.03¾
Butyl, Acetate, norm drs, frt all'd ... lb.	...	.10	...	.10	.09	.10
tks, frt all'd ... lb.	...	.09	...	.09	.08	.09
Secondary, tks, frt all'd lb.	...	.06½	...	.06½	.05½	.06½
drs, frt all'd ... lb.	.07½	.08	.07½	.08	.068	.08
Aldehyde, 50 gal drs, wks ... lb.	.15½	.17½	.15½	.17½	.15½	.17½
Carbinol, norm (see Normal Amyl Alcohol)						
Crotonate, norm, 55 and 110 gal drs, delv ... lb.	...	.35	...	.35	.35	.75
Lactate ... lb.	.23½	.24½	.23½	.24½	.22½	.24½
Oleate, drs, frt all'd ... lb.	...	.25	...	.25	...	.25
Propionate, drs ... lb.	.16½	.17	.16½	.17	.16½	.18½
tks, delv ... lb.	...	.15½	...	.15½	.15½	.17
Stearate, 50 gal drs ... lb.	...	.28½	...	.28½	.26½	.28½
Tartrate, drs ... lb.	.55	.60	.55	.60	.55	.60
Butyraldehyde, drs, lcl, wks lb.	...	.35½	...	.35½	...	.35½
Cadmium Metal ... lb.	.80	.85	.80	.85	.50	.85
Sulfide, orange, boxes ... lb.	...	.75	.75	.85	.75	.90
Calcium, Acetate, 150 lb bgs c-l, delv ... 100 lb.	...	1.90	...	1.90	1.65	1.90
Arsenate, c-l, E of Rockies, dealers, drs ... lb.	.06	.06½	.06	.07¼	.06¾	.07¼
Carbide, drs ... lb.	...	.04¼	.05	.06	.05	.06
Carbonate, tech, 100 lb bgs c-l ... lb.	...	1.00	...	1.00	...	1.00
Chloride, flake, 375 lb drs, burlap bgs, c-l, delv ... ton	...	20.50	...	22.00	...	22.00
paper bags, c-l, delv ... ton	20.50	35.00	20.50	36.00	23.00	36.00
Solid, 650 lb drs, c-l, delv ... ton	19.00	35.00	19.00	35.00	...	20.00
Ferrocyanide, 350 lb bbls wks ... lb.	...	.20	...	.20	...	.20
Gluconate, Pharm, 125 lb bbls ... lb.	.50	.57	.50	.57	.50	.57
Levulinate, less than 25 bbl lots, wks ... lb.	...	3.00	...	3.00	...	3.00
Nitrate, 100 lb bags ... ton	...	29.00	28.00	29.00	...	28.00
Palmitate, bbls ... lb.	.22	.24	.22	.24	.22	.23
Phosphate, tribasic, tech, 450 lb bbls ... lb.	.0635	.0705	.0635	.07½	.06½	.07½
Resinate, precip, bbls ... lb.	.13	.14	.13	.14	.13	.14
Stearate, 100 lb bbls ... lb.	.20½	.22½	.20½	.22½	.19	.21
Camphor, slabs ... lb.	.85	.86	.83	.84	.46	.77
Powder ... lb.	.85	.86	.83	.84	.45	.47
Carbon Bisulfide, 500 lb drs lb.	.05	.05¾	.05	.05¾	.05	.05¾
Black, c-l, bgs, delv, price varying with zone† ... lb.	.028	...	.02¾	.03¾	.02¾	.03¾
lcl, bgs, f.o.b.whse ... lb.	...	.06¼	...	.06¼	...	.06¼
cartons, f.o.b. whse ... lb.	...	.06¼	...	.06¼	...	.06¼
cases, f.o.b. whse ... lb.	...	.07	...	.07	...	.07
Decolorizing, drs, c-l ... lb.	.08	.15	.08	.15	.08	.15
Dioxide, Liq 20-25 lb cyl lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, 55 or 110 gal drs, c-l, delv ... lb.	...	.66½	...	.66½	.05	.05½
Casein, Standard, Dom, grd lb.	.13	.14	.10	.14	.07	.23
80-100 mesh, c-l bgs ... lb.	.13½	.14½	.11	.14½	.07½	.23½
Castor Pomace, 5½ NH_3, c-l, bgs, wks ... ton	...	17.50	...	17.50	16.50	18.50
Imported, ship, bgs ... ton	...	20.00	...	20.00	18.00	20.00
Celluloid, Scraps, ivory cs lb.	.12	.15	.12	.15	.12	.15
Transparent, cs ... lb.	...	.20	...	.20	...	.20
Cellulose, Acetate, 50 lb kgs ... lb.	...	.33	.33	.34	.35	.36
Chalk, dropped, 175 lb bbls lb.	...	.02¾	.02¾	.03¾	.02¾	.03¾
Precip, heavy, 560 lb cks lb.	...	.03¼	.02¾	.03¼	.02¾	.03¼
Light, 250 lb cks ... lb.	...	.03¼	.03¼	.04	.03¼	.04
Charcoal, Hardwood, lump, blk, wks ... bu.	...	.15	...	.15	...	.15
Softwood, bgs, delv* ... ton	25.00	36.00	25.00	36.00	23.00	36.00
Willow, powd, 100 lb bbls, wks ... lb.	.06	.07	.06	.07	.06	.07
Chestnut, clarified, tks, wks lb.	...	.01¾	...	.01¾	...	.01⅝
25%, bbls, wks ... lb.	...	.02½	...	.02½	...	.02
China Clay, c-l, blk mines ton	...	7.60	7.60	9.50	7.00	7.60
Imported, lump, blk ... ton	26.00	nom.	...	26.0'	22.00	26.00
Chlorine, cyls, lcl, wks, contract ... lb.	...	.07¼	.07½	.08½	.07½	.08½
cyls, c-l, contract ... lb j	...	.05¼	...	.05¼	.05¼	.05½
Liq. tk, wks, contract 100 lb.	...	1.75	...	1.75	1.75	2.00
Multi, c-l, cyls, wks, cont ... lb.	...	.019	...	.019	1.90	2.15
Chloroacetophenone, tins, wks ... lb.	3.00	3.50	3.00	3.50	3.00	3.50
Chlorobenzene, Mono, 100 lb drs, lcl, wks ... lb.	.06	.07½	.06	.07½	.06	.07½
Chloroform, tech, 1000 lb drs ... lb.	...	.20	.20	.21	.20	.21
USP, 25 lb tins ... lb.	.30	.31	.30	.31	.30	.31
Chloropicrin, comml cyls ... lb.	...	.80	...	.80	...	.80
Chrome, Green, CP ... lb.	.21	.25	.21	.25	.21	.25
Yellow ... lb.	.13½	.14½	.13½	.14½	.13½	.15½
Chromium Acetate, 8% Chrome, bbls ... lb.	...	.05¾	...	.05¾	.05	.08
Fluoride, powd, 400 lb bbl ... lb.	.27	.28	.27	.28	.27	.28

j A delivered price; * Depends upon point of delivery; † New bulk price, tank cars ¼c per lb. less than bags in each zone.

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Coal tar, bbls ... bbl.	7.50	8.00	7.50	8.00	7.50	8.00
Cobalt Acetate, bbls ... lb.	...	.71	...	.71	.65	.71
Carbonate tech, bbls ... lb.	...	1.38	1.38	1.60	1.25	1.63
Hydrate, bbls ... lb.	...	1.78	...	1.78	...	1.78
Linoleate, solid, bbls ... lb.	...	.33	...	.33	...	.33
paste, 6%, drs ... lb.	...	.31	...	.31	...	.31
Oxide, black, bgs ... lb.	...	1.84	...	1.84	1.67	1.84
Resinate, fused, bbls ... lb.	...	.13½	...	.13½	...	.13½
Precipitated, bbls ... lb.	...	.34	...	.34	...	.34
Cochineal, gray or bk bgs lb.	.37	.38	.37	.38	.35	.38
Teneriffe silver, bgs ... lb.	.38	.39	.38	.39	.36	.39
Copper, metal, electrol 100 lb.	...	11.50	11.15	11.62½	.10	12.50
Acetate, normal, bbls, wks ... lb.	.22	.24	.22	.24	.21	.24
Carbonate, 52-54% 400 lb. bbls ... lb.	...	.1610	.1610	.169	.14½	.169
Chloride, 250 lb bbls ... lb.	...	.16	.16	.18	.12½	.18
Cyanide, 100 lb drs ... lb.	...	.34	...	.34	...	.34
Oleate, precip, bbls ... lb.	...	.20	...	.20	...	.20
Oxide, black, bbls, wks lb.	...	.18	.18	.18¾	.15	.18¾
red 100 lb bbls ... lb.	...	.19½	.19½	.20	.15¾	.20
Sub-acetate verdigris, 400 lb bbls ... lb.	.18	.19	.18	.19	.18	.19
Sulfate, bbls, c-l, wks 100 lb.	...	4.60	4.45	4.60	4.10	4.75
Copperas crys and sugar bulk c-l, wks ... ton	...	14.00	...	14.00	14.00	16.00
Corn Sugar, tanners, bbls 100 lb.	...	3.21	2.99	3.21	2.89	3.19
Corn Syrup, 42°, bbls 100 lb.	...	3.32	3.02	3.32	2.92	3.17
43°, bbls ... 100 lb.	...	3.37	3.07	3.37	2.97	3.22
Cotton, Soluble, wet, 100 lb bbls ... lb.	.40	.42	.40	.42	.40	.42
Cream Tartar, powd & gran 300 lb bbls ... lb.	...	.32¼	.28¼	.32¼	.22¼	.25¾
Creosote, USP 42 lb cbys lb.	.45	.47	.45	.47	.45	.47
Oil, Grade 1 tks ... gal.	.13½	.14	.13½	.14	.13½	.14
Grade 2 ... gal.	.122	.132	.122	.132	.122	.132
Cresol, USP, drs ... lb.	.09¾	.10¼	.09¾	.10¼	.09½	.10½
Crotonaldehyde, 97%, 55 and 110 gal drs, wks ... lb.	.11	.12	.11	.12	.11	.22*
Cutch, Philippine, 100 lb bale lb.	...	.04½	.04	.04½	.04	.04½
Cyanamid, pulv, bags, c-l, frt all'd, nitrogen basis, unit	...	1.27½	...	1.27½	...	1.27½
D						
Derris root 5% rotenone, bbls ... lb.	.24	.30	.24	.30	.24	.30
Dextrin, corn, 140 lb bgs f.o.b., Chicago ... 100 lb.	...	3.70	3.40	3.70	3.30	3.75
British Gum, bgs ... 100 lb.	...	3.95	3.65	3.95	3.55	3.95
Potato, Yellow, 220 lb bgs lb.	...	.07¾	...	.07¾	.07	.08¾
White, 220 lb bgs, lcl lb.	.08½	.09	.08½	.09	.08	.09
Tapioca, 200 bgs, lcl ... lb.	...	.0715	...	.0715	...	.0715
White, 140 lb bgs ... 100 lb.	...	3.65	3.35	3.65	3.25	3.70
Diamylamine, c-l, drs, wks lb.	...	.47	...	.47	...	.47
lcl drs, wks ... lb.	...	.50	...	.50	...	.50
tks, wks ... lb.	...	.45	...	.45	...	.45
Diamylene, drs, wks ... lb.	.095	.102	.095	.102	.095	.102
tks, wks ... lb.	...	.08½	...	.08½	...	.08½
Diamylether, wks, drs ... lb.	.085	.092	.085	.092	.085	.092
tks, wks ... lb.	...	.075	...	.075	...	.075
Oxalate, lcl, drs, wks ... lb.	...	.30	...	.30	...	.30
Diamylphthalate, drs, wks lb.	.21	.21½	.21	.21½	.19	.21
Diamyl Sulfide, drs, wks lb.	...	1.10	...	1.10	...	1.10
Diatomaceous Earth, see Kieselguhr.						
Dibutoxy Ethyl Phthalate, drs, wks ... lb.	...	.35	...	.35	...	.35
Dibutylamine, lcl, drs, wks lb.	.51	.53	.51	.53	.53	.55
c-l drs, wks ... lb.	...	.50	...	.50	...	...
tks, wks ... lb.	...	.48	...	.48	...	...
Dibutyl Ether, drs, wks, lcl lb.	.24½	.25	.24½	.25	.24½	.25
Dibutylphthalate, drs, wks, frt all'd ... lb.	.19	.19½	.19	.19½	.19	.19½
Dibutyltartrate, 50 gal drs lb.	...	.50	...	.50	.45	.54
Dichlorethylene, drs ... lb.	...	.25	...	.25	...	.25
Dichloroethylether, 50 gal drs, wks ... lb.	.15	.16	.15	.16	.15	.16
tks, wks ... lb.	...	.14	...	.14	...	.14
Dichloromethane, drs, wks lb.	...	.23	...	.23	...	.23
Dichloropentanes, drs, wks lb.	...	.025	...	.025	no prices	
tks, wks ... lb.	...	.0221	...	.0221	no prices	
Diethanolamine, tks, wks ... lb.	...	.22½	...	.22½	.22½	.23
Diethylamine, 400 lb drs, lcl, f.o.b., wks ... lb.	...	.70	...	.70	.70	3.00
Diethylaniline, 850 lb drs lb.	.40	.52	.40	.52	.40	.52
Diethyl Carbinol, drs ... lb.	.60	.75	.60	.75	.60	.75
Diethylcarbonate, com drs lb.	...	.25	...	.25	.31¾	.35
Diethylorthotoluidin, drs ... lb.	.64	.67	.64	.67	.64	.67
Diethylphthalate, 1000 lb drs lb.	.19	.19½	.19	.19½	.19	.19½
Diethylsulfate, tech, drs, wks, lcl ... lb.	.13	.14	.13	.14	.13	.14
Diethyleneglycol, drs ... lb.	.14½	.15½	.14½	.15½	.14½	.17
Mono ethyl ethers, drs ... lb.	.14½	.15½	.14½	.16	.15	.16
tks, wks ... lb.	...	.13½	...	.13½	.13½	.14
Mono butyl ether, drs ... lb.	.22½	.24½	.22½	.24½	.23	.24
tks, wks ... lb.	...	.22	...	.22	...	.22
Diethylene oxide, 50 gal drs, wks ... lb.	.20	.24	.20	.24	.20	.24
Diglycol Laurate, bbls ... lb.	...	.16	.16	.21	.15	.23
Oleate, bbls ... lb.	...	.17	.13	.17	.13	.20
Stearate, bbls ... lb.	...	.22	.22	.26	.20	.28
Dimethylamine, 400 lb drs. pure 25 & 40% sol 100% basis ... lb.	...	1.00	...	1.00	...	1.00
Dimethylaniline, 340 lb drs lb.	.23	.24	.23	.24	.23	.24
Dimethyl Ethyl Carbinol, drs lb.	.60	.75	.60	.75	.60	.75
Dimethyl phthalate, drs, wks, frt all'd ... lb.	...	.18½	...	.18½	...	.19
Dimethylsulfate, 100 lb drs lb.	.45	.50	.45	.50	.45	.50

k Higher price is for purified material; * These prices were on a delivered basis.

	Current	Market	1940 Low	1940 High	1939 Low	1939 High
Dinitrobenzene, 400 lb bbls lb. *k*	...	.18	.18	.19	.16	.19
Dinitrochlorobenzene, 400 lb bbls .... lb.	...	.14	...	.14	.13½	.14
Dinitronaphthalene, 350 lb bbls .... lb.	.35	.38	.35	.38	.35	.38
Dinitrophenol, 350 lb bbls lb.	...	.22	.22	.23	.22	.24
Dinitrotoluene, 300 lb bbls lb.	...	.15½	...	.15½	...	.15½
Diphenyl, bbls .... lb.	.15	.20	.15	.20	.15	.25
Diphenylamine .... lb.	...	.25	.25	.32	.32	.32
Diphenylguanidine, 100 lb drs .... lb.	.35	.37	.35	.37	.31	.37
Dip Oil, see Tar Acid Oil.						
Divi Divi pods, bgs shipmt ton	...	nom.	...	nom.	...	nom.
Extract .... lb.	.05¾	.06¾	.05¾	.06¾	.05¾	.06¾
E						
Egg Yolk, dom., 200 lb cases lb.	.57	.62	.57	.62	.59	.69
Epsom Salt, tech, 300 lb bbls c-l, NY ..... 100 lb.	...	2.10	1.90	2.10	1.90	2.10
USP, c-l, bbls ..... 100 lb.	...	2.10	...	2.10	...	2.10
Ether, USP anaesthesia 55 lb drs .... lb.	...	.26	...	.26	.22	.23
Isopropyl 50 gal drs ... lb.	.07	.08	.07	.08	.07	.08
tks, frt all'd .... lb.	...	.06	...	.06	...	.06
Nitrous conc bottles ... lb.	...	.68	...	.68	...	.68
Synthetic, wks, drs ... lb.	.08	.09	.08	.09	.08	.09
Ethyl Acetate, 85% Ester						
tks, frt all'd' .... lb.	...	.07	.07	.06½	.051	.061
drs, frt all'd .... lb.	...	.08	.07½	.08½	.061	.08
99%, tks, frt all'd .. lb.	...	.07¼	.0685	.08	.0585	.0685
drs, frt all'd .... lb.	...	.08¼	.0785	.08¾	.0685	.0785
Acetoacetate, 110 gal drs lb.	...	.27½	...	.27½	...	.27½
Benzylaniline, 300 lb drs lb.	.86	.88	.86	.88	.86	.88
Bromide, tech drs ..... lb.	.50	.55	.50	.55	.50	.55
Cellulose, drs, wks, frt all'd .... lb.	.45	.50	.45	.50	.45	.50
Chloride, 200 lb drs .... lb.	.18	.20	.18	.20	.22	.24
Chlorocarbonate, cbys .. lb.	...	.30	...	.30	...	.30
Crotonate, drs .... lb.	...	35	...	.35	.35	.75
Formate, drs, frt all'd lb.	.23	.24	.23	.24	.27	.28
Lactate, drs, wks ...... lb.	...	.33½	...	.33½	...	.33½
Oxalate, drs, wks ..... lb.	...	.25	...	.25	.30	.34
Oxybutyrate, 50 gal drs, wks .... lb.	1.00	nom.	.30	1.00	.30	.30½
Silicate, drs, wks ...... lb.	...	.77	...	.77	...	.77
Ethylene Dibromide, 60 lb drs .... lb.	.65	.70	.65	.70	.65	.70
Chlorhydrin, 40%, 10 gal cbys chloro, cont .... lb.	.75	.85	.75	.85	.75	.85
Anhydrous .... lb.	...	.75	...	.75	...	.75
Dichloride, 50 gal drs, wks lb.	.0595	.0694	.0595	.0694	.0545	.0994
Glycol, 50 gal drs, wks .. lb.	.14½	.18½	.14½	.18½	.14½	.21
tks, wks .... lb.	...	.13½	...	.13½	.13½	.16
Mono Butyl Ether, drs, wks .... lb.	.16½	.17½	.16½	.21	.16½	.22
tks, wks .... lb.	...	.15½	...	.15½	.15½	.19
Mono Ethyl Ether, drs, wks .... lb.	.14½	.15½	.14½	.15½	.14½	.17
tks, wks .... lb.	...	.13½	...	.13½	.13½	.15
Mono Ethyl Ether Acetate, drs, wks .... lb.	.11½	.12½	.11½	.13	.11½	.14
tks, wks .... lb.	...	.10½	...	.10½	.10½	.13
Mono Methyl Ether, drs wks .... lb.	.15½	.16½	.15½	.17	.16	.22
tks, wks .... lb.	...	.14½	...	.14½	.14½	.17
Oxide, cyl .... lb.	.50	.55	.50	.55	.50	.55
Ethylideneaniline .... lb.	45	.47½	.45	.47½	.45	.47½
F						
Feldspar, blk pottery ... ton	17.00	19.00	17.00	19.00	17.00	19.00
Powd, blk wks .... ton	14.00	17.50	14.00	17.50	14.00	14.50
Ferric Chloride, tech, crys, 475 lb bbls .... lb.	.05	.07½	.05	.07½	.05	.07½
sol, 42° cbys .... lb.	.06½	.07	.06¼	.07	.06¼	.06½
Fish Scrap, dried, unground wks .... unit *l*	...	3.60	3.60	4.25	3.00	4.25
Acid, Bulk, 6 & 3%, delv Norfolk & Baltimore basis .... unit *m*	...	3.50	3.00	3.50	2.35	3.00
Fluorspar, 98% bgs .... lb.	...	32.60	...	32.60	30.00	33.00
Formaldehyde, USP, 400 lb bbls, wks .... lb.	.055	.06	.05¾	.06¼	.05¾	.06¼
Fossil Flour .... lb.	.02½	.04	.02½	.04	.02½	.04
Fullers Earth, blk, mines ton	...	15.00	...	15.00	10.00	11.00
Imp powd, c-l, bgs .... ton	no prices		...	25.00	23.00	30.00
Furfural (tech) drs, wks lb.	.10	.15	.10	.15	.10	.15
Furfuramide (tech) 100 lb drs .... lb.	...	.30	...	.30	...	.30
Fusel Oil, 10% impurities lb.	.16	.17¼	.16	.17¼	.12½	.17¼
Fustic, crystals, 100 lb boxes .... lb.	.24	.25	.24	.28	.22	.28
Liquid 50°, 600 lb bbls lb.	.10½	.14	.10½	.14	.09½	.14
Solid, 50 lb boxes ..... lb.	.19	.21	.19	.21	.17½	.21
G						
G Salt paste, 360 lb bbls .. lb.	...	.45	.45	.47	.45	.47
Gambier, com 200 lb bgs lb.	...	.07	...	.07	.06¾	.07¾
Singapore cubes, 150 lb bgs .... 100 lb.	...	.09	.09	.10	.08	.10
Gelatine, tech, 100 lb cs ... lb.	.42	.43	.42	.43	.42	.50
Glauber's Salt, tech, c-l, bgs, wks* .... 100 lb.	.95	1.18	.95	1.18	.95	1.18
Anhydrous, see Sodium Sulfate						

l + 10; m + 50; * Bbls. are 20c higher.

Current

Glue, Bone
Hexalene

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Glue, bone, com grades, c-l bgs ... lb.	.13½	.15	.13½	.15½	.13½	.15½
Better grades, c-l, bgs lb.	.15	.23	.15	.23	.11½	.15½
Glycerin, CP, 550 lb drs lb.	...	.12½	...	.12½	...	.12½
Dynamite, 100 lb drs ... lb.	...	nom.	...	nom.	...	.09
Saponification, drs ... lb.	...	.13	...	.13	.08½	.10
Soap Lye, drs ... lb.	.07¾	.08¼	.07¾	.08¼	.07½	.07⅞
Glyceryl Bori-Borate, bbls lb.	...	.40	...	.40	...	.40
Monoricinoleate, bbls ... lb.	...	.27	...	.27	...	.27
Monostearate, bbls ... lb.	...	.30	...	.30	...	.30
Oleate, bbls ... lb.	...	.22	...	.22	...	.22
Phthalate ... lb.	...	.38	.37	.38	...	.37
Glyceryl Stearate, bbls ... lb.	...	.18	...	.18	.24	.27½
Glycol Bori-Borate, bbls .. lbs.	...	.22	...	.22	.22	.23
Phthalate, drs ... lb.	...	.38	...	.38	.38	.40
Stearate, drs ... lb.	...	.26	...	.26	...	.26
GUMS						
Gum Aloes, Barbadoes ... lb.	.85	.90	.85	.90	.85	.90
Arabic, amber sorts ... lb.	.08½	.09	.08½	.14	.09	.24
White sorts, No. 1, bgs lb.	.28	.29	.28	.35	.23	.35
No. 2, bgs ... lb.	.27	.28	.27	.34	.21	.34
Powd, bbls ... lb.	.12½	.13	.12½	.17	.12½	.27
Asphaltum, Barbadoes (Manjak) 200 lb bgs, f.o.b. NY ... lb.	.04½	.05½	.02½	.10½	.02½	.10½
California, f.o.b. NY, drs ton	29.00	36.50	29.00	36.50	29.00	55.00
Egyptian, 200 lb cases, f.o.b. NY ... lb.	.12	.15	.12	.15	.12	.15
Benzoin Sumatra, USP, 120 lb cases ... lb.	.20	.21	.17	.24	.17	.34
Copal, Congo, 112 lb bgs, clean, opaque ... lb.	...	.29½	.	.29½	.18¼	.29½
Dark amber ... lb.	...	.12⅜	.11⅜	.12⅜	.07⅛	.11⅜
Light amber ... lb.	...	.17	...	.17	.11¼	.17
Copal, East India, 180 lb bgs						
Macassar pale bold ... lb.	...	.13⅞	.13⅞	.15⅝	.11⅜	.15¼
Chips ... lb.	...	.07½	.07½	.09	.05⅜	.08½
Dust ... lb.	...	.04¾	.04¾	.06¾	.03¼	.07⅛
Nubs ... lb.	...	.11⅛	.11⅛	.14⅜	.09½	.13¾
Singapore, Bold ... lb.	...	.14⅝	.14⅝	.17½	.14	.18¼
Chips ... lb.	...	.08⅜	.08⅜	.09⅛	.05⅝	.10¼
Dust ... lb.	...	.04¾	.04¾	.06¾	.03¼	.07⅛
Nubs ... lb.	...	.11	.11	.13½	.09⅝	.14⅜
baskets, Loba A ... lb.	...	.14¼	.14¼	.17⅜	.10½	.14⅞
Copal Manila, 180-190 lb	...	.13¾	.13¾	.16¾	.09¾	.14½
Loba B ... lb.	...	.13½	.13½	.16⅛	.09	.14⅛
Loba C ... lb.	...	.12⅛	.12⅛	.14½	.07⅞	.12½
DBB ... lb.	...	.06⅞	.06⅞	.08¾	.05⅛	.08½
MA sorts ... lb.	...	.09	.09	.13¾	.05⅞	.11
Copal Pontianak, 224 lb cases, bold genuine .. lb.	...	.15½	.15⅛	.18½	.15¼	.18½
Chips ... lb.	...	.08⅜	.08⅜	.10½	.07⅛	.11½
Mixed ... lb.	...	.14½	.14⅛	.16⅝	.13⅜	.16⅝
Nubs ... lb.	...	.10¾	.10¾	.13½	.10½	.14⅜
Split ... lb.	...	.13½	.13½	.16⅛	.12	.16⅛
Damar Batavia, 136 lb cases						
A ... lb.	...	.21⅝	.21⅝	.22¾	.20	.23¾
B ... lb.	...	.20¼	.20⅛	.21⅛	.18½	.21⅛
C ... lb.	...	.14⅝	.15⅝	.15¼	.13½	.15⅝
D ... lb.	...	.13¼	.13¼	.13¾	.12¼	.14¼
A/D ... lb.	...	.13⅞	.13⅞	.14½	.12¾	.15¼
A/E ... lb.	...	.12⅞	.12⅞	.13⅜	.11⅜	.13¾
E ... lb.	...	.10	.10	.10⅜	.07⅜	.10
F ... lb.	...	.08	.08	.08¾	.07¼	.08¾
Singapore, No. 1 ... lb.	...	.16⅞	.16⅞	.19⅝	.13¼	.19½
No. 2 ... lb.	...	.12¾	.12¾	.15¾	.10½	.16⅜
No. 3 ... lb.	...	.07⅛	.07⅛	.09	.05¼	.09⅛
Chips ... lb.	...	.11	.11	.12½	.09¼	.12½
Dust ... lb.	...	.07⅛	.07⅛	.09	.05¼	.09⅛
Seeds ... lb.	...	.09⅞	.09⅞	.10½	.07⅜	.10½
Elemi, cns, c-l ... lb.	...	.10½	.10⅛	.11⅝	.08⅛	.12⅝
Ester ... lb.	.06¼	.06¾	.06¼	.06¾	.06	.07
Gamboge, pipe, cases ... lb.	.70	.75	.70	.75	.55	.80
Powd, bbls ... lb.	.75	.80	.75	.80	.60	.85
Ghatti, sol, bgs ... lb.	.11	.15	.11	.15	.11	.15
Karaya, bbls, bxs, drs ... lb.	.14	.33	.14	.33	.14	.33
Kauri, NY						
Brown XXX, cases ... lb.	...	.60	...	60	.60	.60½
BX ... lb.	...	.38	...	.38	...	.38
B1 ... lb.	...	.28	...	.28	...	.28
B2 ... lb.	...	.24	...	.24	...	.24
B3 ... lb.	...	.18½	...	.18½	...	.18½
Pale XXX ... lb.	...	.61	...	.61	...	.61
No. 1 ... lb.	...	.41	...	.41	...	.41
No. 2 ... lb.	...	.24	...	.24	...	.24
No. 3 ... lb.	...	.17¾	...	.17¾	...	.17¾
Kino, tins ... lb.	4.00	4.50	4.00	4.50	2.50	4.50
Mastic ... lb.	.85	.90	.85	.90	.55	.90
Sandarac, prime quality, 200 lb bgs & 300 lb cks ... lb.	.35	.36	.35	.37	.15	.37
Senegal, picked bags ... lb.	...	.30	...	.30	.25	.30
Sorts ... lb.	...	.13	...	.13	.09¼	.13
Thus, bbls ... 280 lbs.	15.00	15.25	15.00	15.25	13.50	15.25
Tragacanth, No. 1, cases .. lb.	2.65	2.70	2.65	2.70	2.25	2.50
No. 2 ... lb.	2.55	2.60	2.55	2.60	1.90	2.40
No. 3 ... lb.	2.45	2.50	2.45	2.50	1.60	2.25
Yacca, bgs ... lb.	.03½	.04	.03½	.04	.03½	.08
H						
Helium, cyl (200 cu. ft.) cyl.	...	25.00	...	25.00	...	25.00
Hematine crystals, 400 lb bbls lb.	.20	.30	.20	.30	.20	.34
Hemlock, 25%, 600 lb bbls. wks ... lb.	...	.03⅜	.03⅛	.03⅜	.03	.03⅜
tks ... lb.	...	.03	...	.03	.02⅝	.02¾
Hexalene, 50 gal drs, wks lb.	...	.80	...	.80	...	.30

Prices

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Hexane, normal 60-70° C. Group 3, tks .... gal.	...	.10½	...	.10½	...	.10½
Hexamethylenetetramine, powd, drs .... lb.	.32	.33	.32	.33	.32	.36
Hexyl Acetate, secondary, delv, drs .... lb.	.13	.13½	.13	.13½	.13	.13½
tks .... lb.	...	.12	...	.12		.12
Hoof Meal, f.o.b. Chicago unit	2.50	2.75	2.50	3.15	2.50	3.25
Hydrogen Peroxide, 100 vol. 140 lb cbys .... lb.	...	.20	...	.20	.19½	.20
Hydroxylamine Hydrochloride .... lb.	...	3.15	...	3.15	...	3.15
Hypernic, 51°, 600 lb bbls lb.	...	.14	...	.14	.13	.21
Indigo, Bengal, bbls ..... lb.	1.63	1.67	1.63	1.67	...	2.40
Synthetic, liquid ...... lb.	.16½	.19	.16½	.19	.16½	.19
Iodine, Resublimed, jars . lb.	...	2.00	...	2.00	1.75	2.00
Irish Moss, ord, bales ... lb.	.15	.16	.15	.16	.10	.10
Bleached, prime, bales .. lb.	.28	.30	.28	.30	.19	.20
Iron Acetate Liq. 17°, bbls delv .... lb.	.03	.04	.03	.04	.03	.04
Chloride see Ferric Chloride.						
Nitrate, coml, bbls . 100 lb.	2.75	3.00	2.75	3.00	2.32	3.11
Isobutyl Carbinol (128-132° C) drs, wks .... lb.	.33	.34	.33	.34	.33	.34
tks, wks .... lb.	...	.32	...	.32	...	.32
Isopropyl Acetate, tks, frt all'd .... lb.	...	.06	.05½	.06	.051	.06
drs, frt all'd .... lb.	.07	.07½	.06½	.07½	.061	.07
Ether, see Ether, isopropyl.						
Keiselguhr, dom bags, c-l, Pacific Coast .... ton	22.00	35.00	22.00	35.00	22.00	35.00
L						
Lead Acetate, f.o.b. NY, bbls, White, broken .... lb.	...	.11	...	.11	.10	.11
cryst, bbls .... lb.	...	.11	...	.11	.10	.11
gran, bbls .... lb.	...	.11¾	...	.11¾	.10¾	.11¾
powd, bbls .... lb.	...	.11¾	...	.11¾	.10¾	.11¾
Arsenate, East, drs ... lb.	...	.08½	.08½	.11	.10	.11½
Linoleate, solid, bbls ... lb.		.19		.19	...	.19
Metal, c-l, NY ..... 100 lb.	5.00	5.05	5.00	5.25	4.75	5.55
Nitrate, 500 lb bbls, wks lb.	.11	.14	.11	.14	.10	.12
Oleate, bbls .... lb.	.18½	.20	.18½	.20	.18½	.20
Red, dry, 95% Pb_3O_4, delv .... lb.	...	.07¾	.07½	.08	.07¼	.08½
97% Pb_3O_4, delv ... lb.	...	.0765	.0765	.08¼	.07½	.0835
98% Pb_3O_4, delv ... lb.	...	.08½	.08	.08¾	.07¾	.0860
Resinate, precip, bbls . lb.	...	.16½	...	.16½	...	.16½
Stearate, bbls .... lb.	...	.26	...	.26	.22	.25
Titanate, bbls, c-l, f.o.b. wks, frt all'd .... lb.	.10	.10¼	.10	.10¼	.11	.11½
White, 500 lb bbls, wks, lb.	...	.07¼	.07	.07¼	...	.07
Basic sulfate, 500 lb bbls, wks .... lb.	...	.06½	.06¼	.06½	...	.06¼
Lime, chemical quicklime, f.o.b., wks, bulk ... ton	7.00	13.00	7.00	13.00	7.00	8.00
Hydrated, f.o.b. wks .. ton	8.50	16.00	8.50	16.00	8.50	12.00
Lime Salts, see Calcium Salts						
Lime, sulfur, dealers, tks. gal.	...	.08½	.07½	.11½	.08	.11½
drs .... gal.	.11	.15	.11	.16	.11	.16
Linseed Meal, bgs ...... ton	...	27.50	27.50	37.00	34.00	42.00
Litharge, coml, delv, bbls lb.	.06¾	.07	.06½	.06¾	.06¼	.071
Lithopone, dom, ordinary, delv, bgs .... lb.	...	.036	.	.036	.03⅝	.04⅛
bbls .... lb.	...	.0385	.03¾	.03¾	.04	.04⅜
High strength, bgs ..... lb.	...	.05	...	.05	.05¼	.05⅝
bbls .... lb.	...	.05¼	...	.05¼	.05½	.05⅞
Titanated, bgs .... lb.	...	.05	...	.05	.05¼	.05⅝
bbls .... lb.	...	.05¼	...	.05¼	.05½	.05⅞
Logwood, 51°, 600 lb bbls lb.	.10½	.12½	.10½	.12½	.09½	.12½
Solid, 50 lb boxes .... lb.	.16½	.20½	.16½	.20½	.15	.20½
M						
Madder, Dutch .... lb.	.22	.25	.22	.25	.22	.25
Magnesite, calc, 500 lb bbls ton	58.00	62.00	58.00	66.00	58.00	66.00
Magnesium Carb, tech, 70 lb bgs, wks .... lb.	...	.06¼	...	.06¼	.05¾	.06½
Chloride flake, 375 lb bbls, c-l, wks .... ton	...	32.00	32.00	42.00	39.00	42.00
Fluosilicate, crys, 400 lb bbls, wks .... lb.	.10	.10½	.10	.10½	.10	.10½
Oxide, calc tech, heavy bbls, frt all'd ..... lb.	...	.26	.25	.30	.25	.30
Light bbls above basis lb.	...	.26	.20	.26	.20	.25
USP Heavy, bbls, above basis .... lb.	.25	.30	.25	.30	.25	.30
Palmitate, bbls .... lb.	.33	nom.	.33	nom.	.33	nom.
Silicofluoride, bbls .... lb.	.11	.11½	.11	.11½	.09½	.11½
Stearate, bbls .... lb.	.24	.27	.24	.27	.21	.24
Manganese, acetate, drs .. lb.	...	.26½	...	.26½	...	.26½
Borate, 30%, 200 lb bbls lb.	.15	.16	.15	.16	.15	.16
Chlorate, 600 lb cks ... lb.	...	.08½	...	.08½	.07½	.12
Dioxide, tech (peroxide), paper bags, c-l ...... ton	...	62.50	62.50	66.50	47.50	66.50
Hydrate, bbls .... lb.	...	.82	...	.82	...	.32
Linoleate, liq, drs ..... lb.	.18	.19½	.18	.19½	.18	.19¼
solid, precip, bbls .... lb.	...	.19	...	.19	...	.19
Resinate, fused, bbls ... lb.	.08¼	.08½	.08¼	.08½	.08¼	.08½
precip, drs .... lb.	...	.12	...	.12	...	.12
Sulfate, tech, anhyd, 90-95%, 550 lb drs ... lb.	.08	.08½	.08	.08½	.07	.08½
Mangrove, 55%, 400 lb bbls lbs.	...	...	...	...	...	.04
Bark, African .... ton	...	30.00	30.00	35.00	23.00	35.00

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Mannitol, pure cryst, cs, wks lb.	.95	1.00	.95	1.00	.95	1.20
commercial grd, 250 lb bbls ...... lb.	.42	.50	.42	.50	.42	.57
Marble Flour, blk ...... ton	12.00	14.00	12.00	14.00	12.00	14.00
Mercury chloride (Calomel) lb.	...	2.70	2.45	2.70	1.36	2.57
Mercury metal .. 76 lb. flasks	197.00	228.00	197.00	228.00	95.00	170.00
Mesityl Oxide, f.o.b. dest., tks ...... lb.	...	.15	...	.15	.10½	.15
drs, c-l ...... lb.	...	.16	...	.16	.11½	.16
drs, lcl ...... lb.	...	.16½	...	.16½	.12	.16½
Meta-nitro-aniline ...... lb.	.67	.69	.67	.69	.67	.69
Meta-nitro-paratoluidine 200 lb bbls ...... lb.	...	1.30	1.30	1.40	1.30	1.55
Meta-phenylene diamine 300 lb bbls ...... lb.	...	.65	...	.65	.80	.84
Meta-toluene-diamine 300 lb bbls ...... lb.	...	.65	.65	.67	.65	.67
Methanol, denat, grd, drs, c-l frt all'd ...... gal.	...	.45	...	.45	.41	.46
tks, frt all'd ...... gal.	...	.40	...	.40	.35	.40
Pure, drs, c-l, frt all'd' gal.	...	.35	.35	.38	...	.38
tks ...... gal.	...	.30	.30	.33	...	.33
95%, tks ...... gal.	...	.29	.28	.31	...	.31
97%, tks ...... gal.	...	.30	.29	.32	...	.32
Methyl Acetate, tech tks, delv ...... lb.	.06	.07	.06	.07	.06	.06½
55 gal drs, delv ...... lb.	.07	.08	.07	.08	.07	.08
C.P. 97-99%, tks, delv lb.	.09½	10½	.09½	.10½	...	.06¼
55 gal drs, delv ...... lb.	.10½	.11½	.10½	.11½	.07¼	.07¾
Acetone, frt all'd, drs gal. p	...	.44	.41	.44	.30	.44
tks, frt all'd, drs .. gal. p	...	.35	.35	.39	.25	.35
Synthetic, frt all'd, east of Rocky M., drs ...... gal. p	...	.44	.38	.44	.38	.41
tks, frt all'd .. gal.	...	.36	...	.36	...	.31½
West of Rocky M., frt all'd, drs .. gal. p	...	.48	.42	.48	...	.42
tks, frt all'd ... gal. p	...	.39½	.35	.39½	...	.35
Anthraquinone ...... lb.	...	.83	...	.83	...	.83
Butyl Ketone, tks ...... lb.	...	.10½	...	.10½	...	.10½
Cellulose, 100 lb lots, frt all'd ...... lb.	...	.70	...	.70	...	...
less than 100 lbs. f.o.b. wks ...... lb.	...	.75	...	.75	...	...
Chloride, 90 lb. cyl ...... lb.	.32	.40	.32	.40	.32	.40
Ethyl Ketone, tks, frt all'd lb.	...	.06	.05½	.06	.05	.05½
50 gal drs, frt all'd' c-l lb	.07	.07½	.06½	.07½	.06	.07
Formate, drs, frt all'd .. lb.	...	.89	...	.89	.35	.39
Hexyl, Ketone, pure, drs lb.	...	.60	...	.60	...	.60
Lactate, drs, frt all'd ... lb.	...	.80	...	.80	...	.30
Mica, dry grd, bgs, wks .. ton	...	30.00	...	30.00	...	30.00
Michler's Ketone, kgs ... lb.	...	2.50	...	2.50	...	2.50
Monoamylamine, c-l, drs, wks lb.	...	.52	...	.52	...	.52
lcl, drs, wks ...... lb.	.53	.55	.53	.55	...	...
tks, wks ...... lb.	...	.50	...	.50	...	...
Monobutylamine, drs, c-l, wks ...... lb.	...	.50	...	.50	.50	.65
lcl, wks ...... lb.	.51	.53	.51	.53	...	...
tks, wks ...... lb.	...	.48	...	.48	...	...
Monochlorobenzene, see "C"						
Monoethanolamine, tks, wks lb.	...	.23	...	.23	...	.23
Monoethylamine (100% basis) lcl, drs, f.o.b. wks ... lb.	...	.65	...	.65	...	
Monomethylamine, drs, frt all'd, E Mississippi, c-l lb.	...	.65	...	.65	...	.65
Monomethylparamiosulfate, 100 lb drs ...... lb.	3.75	4.00	3.75	4.00	3.75	4.00
Morpholine, drs 55 gal, lcl wks ...... lb.	...	.75	...	.75	...	...
Myrobalans 25%, liq bbls lb.	no prices		no prices		.03¾	.04¼
50% Solid, 50 lb boxes lb.	no prices		no prices		.04¾	.05
J1 bgs ...... ton	...	30.00	28.50	32.00	24.00	50.00
J2 bgs ...... ton	...	26.00	23.00	25.00	19.00	41.00

N

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Naphtha, v.m.&p. (deodorized) see petroleum solvents.						
Naphtha, Solvent, water-whte, tks ...... gal.	...	.27	...	.27	.26	.27
drs, c-l ...... gal.	...	.32	...	.32	.31	.32
Naphthalene, dom, crude bgs. wks ...... lb.	2.25	2.75	2.25	2.75	2.25	2.85
imported, cif, bgs ... lb.	nom.	3.00	...	3.00	1.50	1.85
Balls, flakes, pks ...... lb.	.06¼	.07¾	.06¼	.07¾	.06½	.07½
Balls, ref'd, bbls, wks lb.	...	.07	.06¾	.07	.05¾	.06¾
Flakes, ref'd, bbls, wks lb.	...	.07	.06¾	.07	.05¾	.06¾
Nickel Carbonate, bbls ... lb.	.36	.36½	.36	.36½	.36	.37½
Chloride, bbls ...... lb.	.18	.20	.18	.20	.18	.20
Metal ingot ...... lb.		.35	...	.35	...	.35
Oxide, 100 lb kgs, NY lb.	.35	.38	.35	.38	.35	.37
Salt, 400 lb bbls, NY lb.	.13	.13½	.13	.13½	.13	.13½
Single, 400 lb bbls, NY lb.	.13	.13½	.13	.13½	.13	.13½
Nicotine, 40%, drs, sulfate, 55 lb drs ...... lb.	...	.70	...	.70	.70	.76
Nitre Cake, blk ...... ton	...	16.00	...	16.00	...	16.00
Nitrobenzene redistilled, 1000 lb drs, wks ...... lb.	.08	.09	.08	.10	.08	.10
tks ...... lb.	...	.07	...	.07	.07	.07½
Nitrocellulose, c-l, lcl, wks lb.	.20	.29	.20	.29	.22	.29
Nitrogen Sol. 45½% ammon, f.o.b. Atlantic & Gulf ports, tks, unit ton, N basis	...	1.2158	...	1.2158	...	1.2158
Nitrogenous Mat'l, bags imp unit	...	2.40	2.40	2.60	2.25	2.85
dom, Eastern wks ... unit	...	2.40	2.40	2.90	2.30	3.00
dom. Western wks ... unit	...	1.95	1.95	2.00	1.90	2.25
Nitronaphthalene, 550 lb bbls lb.	.24	.25	.24	.25	.24	.25
Nutgalls Alleppo, bgs ... lb.	.29	.32	.29	.30	.22	.23

a Country is divided in 4 zones, prices varying by zone; p Country is divided into 4 zones. Also see footnote directly above; q Naphthalene quoted on Pacific Coast F.A.S. Phila., or N. Y.

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Oak Bark Extract, 25%, bbls lb.	.03⅛	.03⅜	.03⅛	.03⅜	.03⅛	.03½
tks .... lb.	...	.02¼	...	.02¼	...	.02¼
Octyl Acetate, tks, wks ... lb.	...	.15	...	.15	.15	.17
Orange-Mineral, 1100 lb cks NY .... lb.	.10¾	.12	.10½	.12	.10¼	.10¾
Orthoaminophenol, 50 lb kgs lb.	2.15	2.25	2.15	2.25	2.15	2.25
Orthoanisidine, 100 lb drs lb.	...	.70	.70	.74	.70	.74
Orthochlorophenol, drs ... lb.	...	.32	...	.32	...	.32
Orthocresol, 30.4°, drs, wks lb.	.16	.16½	.16	.16½	.14½	.17½
Orthodichlorobenzene, 1000 lb drs .... lb.	.06	.07	.06	.07	.06	.07
Orthonitrochlorobenzene, 1200 lb drs, wks .... lb.	.15	.18	.15	.18	.15	.18
Orthonitroparachlorphenol, tins .... lb.	...	.75	...	.75	...	.75
Orthonitrophenol. 350 lb drs .... lb.	.85	.90	.85	.90	.85	.90
Orthonitrotoluene, 1000 lb drs, wks .... lb.	...	.09	...	.09	.08	.10
Orthotoluidine, 350 lb bbls, lcl .... lb.	...	.19	...	.19	.16	.19
Osage Orange, cryst, bbls lb.	...	.21	...	.21	.17	.25
51° liquid .... lb.	...	.10	...	.10	.07	.09
P						
Paraffin, rfd, 200 lb bgs						
122-127° M P .... lb.	.05	.05¼	.05	.0675	.03¾	.06¾
128-132° M P .... lb.	.068	.0705	.068	.0705	.04	.0705
133-137° M P .... lb.	.073	.0755	.073	.0755	.0465	.0755
Para aldehyde, 99%, tech, 110-55 gal drs, wks .. lb.	.10	.11¼	.10	.11¼	.10	.16*
Aminoacetanilid, 100 lb kgs .... lb.	...	.85	...	.85	...	.85
Aminohydrochloride, 100 lb kgs .... lb.	1.25	1.30	1.25	1.30	1.25	1.30
Aminophenol, 100 lb kgs lb.	...	1.05	...	1.05	...	1.05
Chlorophenol, drs ...... lb.	...	.32	...	.32	.30	.45
Dichlorobenzene 200 lb drs, wks .... lb.	.11	.12	.11	.12	.11	.12
Formaldehyde, drs, wks lb.	.34	.35	.34	.35	.34	.35
Nitroacetanilid, 300 lb bbls .... lb.	.45	.52	.45	.52	.45	.52
Nitroaniline, 300 lb bbls, wk .... lb.	...	.47	...	.47	.45	.47
Nitrochlorobenzene, 1200 lb drs, wks .... lb.	...	.15	.15	.16	.15	.16
Nitro-orthotoluidine, 300 lb bbls .... lb.	2.75	2.85	2.75	2.85	2.75	2.85
Nitrophenol, 185 lb bbls lb.	...	.35	.35	.37	.35	.37
Nitrosodimethylaniline, 120 lb bbls .... lb.	.92	.94	.92	.94	.92	.94
Nitrotoluene, 350 lb bbls lb.	...	.30	...	.30	.30	.35
Phenylenediamine, 350 lb bbls .... lb.	1.25	1.30	1.25	1.30	1.25	1.30
Toluenesulfonamide, 175 lb bbls .... lb.	...	.70	.70	.75	.70	.75
tks, wks .... lb.	...	.31	...	.31	...	.31
Toluenesulfonchloride, 410 lb bbls, wks .... lb.	.20	.22	.20	.22	.20	.22
Toluidine, 350 lb bbls, wks .... lb.	...	.48	.48	.50	.48	.58
Paris Green, dealers, drs lb.	.23	.26	.23	.26	.23	.26
Pentane, normal, 28-38° C, group, 3 tks .... gal.	...	.08½	...	.08½	...	.08½
drs, group 3 .... gal.	.11½	.16	.11½	.16	.11½	.16
Perchlorethylene, 100 lb drs, frt all'd .... lb.	.08	.08½	.08	.08¾	.08	.10½
Petrolatum, dark amber, bbls. .... lb.	...	.03¼	.03¼	.05	.02⅝	.05
White, lily, bbls ...... lb.	...	.05½	.05½	.08½	.05¼	.08½
White, snow, bbls ...... lb.	...	.06½	.06½	.09½	.06¼	.09½
Petroleum Ether, 30-60°, group 3, tks .... gal.	...	.13½	...	.13½	.13	.13½
drs, group 3 .... gal.	.14½	.25½	.14½	.25½	.14	.25½
PETROLEUM SOLVENTS AND DILUENTS						
Cleaners naphthas, group 3, tks, wks .... gal.	06⅞	.07	.06⅞	.07	.06⅜	.07
East Coast, tks wks gal.	.09	.10½	.09	.10½	.09	.10
Hydrogenated, naphthas, frt all'd East, tks gal.	...	.16	...	.16	...	.16
No. 2, tks .... gal.	...	.18	...	.18	...	.18
No. 3, tks .... gal.	...	.16	...	.16	...	.16
No. 4, tks .... gal.	...	.18	...	.18	...	.18
Lacquer diluents, tks, East Coast .... gal.	.09½	.10	.09½	.10	.09	.12½
Group 3, tks ...... gal.	...	.07⅞	...	.07⅞	.07⅜	.08
Naphtha, V.M.P., East tks, wks .... gal.	...	.09½	...	.09½	.09	.10
Group 3, tks, wks ... gal.	.06⅞	.07	.06⅞	.07	.06⅜	.07
Petroleum thinner, 43-47, East, tks, wks ...... gal.	.08¾	.09½	.08¾	.09½	.08½	.10
Group 3, tks, wks .. gal.	...	.05⅞	.05⅞	.07	.05⅜	.06
Rubber Solvents, stand grd, East, tks, wks .. gal.	...	.09½	...	.09½	.09	.10
Group 3, tks, wks .. gal.	.06⅞	.07	.06⅞	.07	.06⅜	.07
Stoddard Solvents, East, tks, wks .... gal.	.08¾	.09½	.08¾	.09½	.08½	.10
Group 3, wks ...... gal.	.06⅜	.06½	.06⅜	.06½	.05⅞	.06½
Phenol, 250-100 lb drs .. lb.	.13	.14¾	.13	.14¾	.13	.15½
tks, wks .... lb.	...	.12	...	.12	.12	.13½
Phenyl-Alpha-Naphthylamine, 100 lb kgs .... lb.	...	1.35	...	1.35	...	1.35
Phenyl Chloride, drs ...... lb.	...	.17	...	.17	...	.17
Phenylhydrazine Hydrochloride, com .... lb.		1.50		1.50		1.50
Phloroglucinol, tech, tins lb.	15.00	16.50	15.00	16.50	15.00	16.50
CP, tons .... lb.	20.00	22.00	20.00	22.00	20.00	22.00

* These prices were on a delivered basis.

Current

Phosphate Rock
Rosins

	Current Market		1940		1939	
			Low	High	Low	High
Phosphate Rock, f.o.b. mines						
70% basis ....ton	...	2.15	1.85	.1.90	...	1.85
72% basis ....ton	...	2.40	2.15	2.35	...	2.35
Florida Pebble, 68% basis ton	...	1.90	1.90	2.85	...	2.85
75-74% basis ......ton	...	2.90	2.90	3.85	...	3.85
75% basis ....ton	...	5.50	...	5.50		5.50
Tennessee, 72% basis ..ton	...	4.50	...	4.50		4.50
Phosphorus Oxychloride 175						
lb cyl ....lb.	.15	.18	.15	.20	.16	.20
Red, 110 lb cases ......lb.	.40	.44	.40	.44	.40	.44
Sesquisulfide, 100 lb cs..lb.	.38	.42	.38	.44	.38	.44
Trichloride, cyl ....lb.	.15	.16	.15	.18	.15	.18
Yellow, 110 lb cs, wks lb.	.18	.20	.18	.20	.24	.30
Phthalic Anhydride, 100 lb						
drs, wks ....lb.	.14½	.15½	.14½	.15½	...	.14½
Pine Oil, 55 gal drs or bbls						
Destructive dist ....lb.	.50	.55	.53	.56	.46	.48
Steam dist wat wh bbls gal.	...	.59	...	.59	...	.59
tks ....gal.	...	.54	...	.54		.54
Pitch Hardwood, wks ...ton	23.75	24.00	23.75	24.00	23.75	24.00
Coaltar, bbl, wks......ton	...	19.00	...	19.00		19.00
Burgundy, dom, bbls, wks lb.	.05½	.06½	.05½	.06½	.05½	.06½
Imported ....lb.	no prices		no prices		.15	.16
Petroleum, see Asphaltum in Gums' Section.						
Pine, bbls ....bbl.	6.00	6.50	6.00	6.50	6.00	6.25
Platinum, ref'd ....oz.	35.00	38.00	35.00	40.00	32.00	40.00
POTASH						
Potash, Caustic, wks, sol..lb.	.06¼	.06¾	.06¼	.06¾	.06¼	.06½
flake ....lb.	.07	.07½	.07	.07½	.07	.07⅜
liquid, tks ....lb.	.03½	.03¾	.03½	.03¾	...	.02⅞
Manure Salts, imported						
30% basis, blk .....unit	...	.58½	...	.58½	...	.58½
Potassium Abietate, bbls ..lb	...	.08	.08	.09	...	.09
Acetate, tech, bbls, delv lb.	...	.26	...	.26	...	.26
Bicarbonate, USP, 320 lb						
bbls ....lb.	no prices		...	.18	...	.18
Bichromate Crystals, 725						
lb cks* ....lb.	.08⅞	.09¼	.08¾	.09¼	.08¾	.09¼
Binoxalate, 30 lb bbls ..lb.	...	.23	...	.23	...	.23
Bisulfate, 100 lb kgs ...lb.	.15½	.18	.15½	.18	.15½	.18
Carbonate, 80-85% calc 800						
lb cks ....lb.	.06½	.06¾	.06½	.07	.06½	.07
liquid, tks ....lb.		.0275	.0275	.03		.02⅞
drs, wks ....lb.	.03½	.03¾	.03	.03½	.03	.03½
Chlorate crys, 112 lb kgs,						
wks ....lb.	.10½	.13	.10½	.13	.09¼	.13
gran, kgs ....lb.	.12	.14½	.12	.14½	.12	.14½
powd, kgs ....lb.	.10	.12½	.10	.12½	.08½	.12½
Chloride, crys, bbls ...lb.	.04	nom.	.04	.04¾	.04	.04¾
Chromate, kgs ....lb.	.24	.27	.24	.27	.19	.28
Cyanide, 110 lb cases...lb.	no prices		no prices		.50	.55
Iodide, 250 lb bbls .....lb.	...	1.35	...	1.35	1.13	1.35
Metabisulfite, 300 lb bbls lb.	.13	.15	.13	.15	.11	.18
Muriate, bgs, dom, blk unit	...	.53½	...	.53½	...	.53½
Oxalate, bbls ....lb.	.25	.26	.25	.26	.25	.26
Perchlorate, kgs, wks...lb.	.09½	.11	.09½	.11	.09	.10½
Permanganate, USP, crys,						
500 & 1000 lb drs, wks lb.	.18½	.19	.18½	.19½	.18½	.19½
Prussiate, red, bbls ....lb.	.40	.45	.38	.45	.30½	.45
Yellow, bbls ....lb.	.15	.16	.15	.16	.14	.16
Sulfate, 90% basis, bgs ton	...	36.25	...	36.25	36.25	38.00
Titanium Oxalate, 200 lb						
bbls ....lb.	.40	.45	.40	.45	.35	.45
Pot & Mag Sulfate, 48% basis						
bgs ....ton	...	24.75	...	24.75	24.75	25.75
Propane, group 3, tks ...lb.	.03¾	.04	.03	.04⅜	.03	.04⅜
Putty, com'l, tubs ...100 lb.	...	3.15	...	6.00	3.00	6.00
Linseed Oil, kgs ...100 lb.	...	5.00	...	4.50	...	4.50
Pyrethrum, conc liq:						
2.4% pyrethrins, drs, frt						
all'd ....gal.	7.15	7.50	7.15	7.50	5.75	7.50
3.6% pyrethrins, drs, frt						
all'd ....gal.	10.65	11.00	10.65	11.00	8.45	11.00
Flowers, coarse, Japan,						
bgs ....lb.	.33	.36	.33	.36	.26	.36
Fine powd, bbls .....lb.	.35	.37	.35	.37	.27	.37
Pyridine, denat, 50 gal drs gal.	...	1.71	...	1.71	1.63	1.71
Refined, drs ....lb.	...	.51	...	.51	.50	.51
Pyrites, Spanish cif Atlantic						
ports, blk ....unit	.12	.13	.12	.13	.12	.13
Pyrocatechin, CP, drs, tins lb.	2.15	2.40	2.15	2.40	2.15	2.75
Q						
Quebracho, 35% liq tks ..lb.	...	.03½	.03¼	.03½	.02⅞	.03⅜
450 lb bbls, c-l ......lb.	...	.04	...	.04	.04	.04⅛
Solid, 63%, 100 lb bales						
cif ....lb.	...	.04½	...	.04½	.04	.04½
Clarified, 64% bales .lb.	...	.04¾	...	.04¾	.04¼	.04¾
Quercitron, 51 deg liq, 450 lb						
bbls ....lb.	.08½	.09½	.08½	.09½	.07½	.08½
Solid, drs ....lb.	.11	.16½	.10	.16½	.10	.12
R						
R Salt, 250 lb bbls, wks lb.	...	.55	...	.55	...	.55
Resorcinol, tech, cans ...lb.	.75	.80	.75	.80	.75	.80
Rochelle Salt, cryst .....lb.	.23¾	.24¼	.22¼	.23¼	.17¾	.21¾
Powd, bbls ....lb.	.22¾	.23¼	.21¾	.22¼	.16¾	.20¼
Rosin Oil, bbls, first run gal.	.45	.50	...	.50	.45	.47
Second run ....gal.	.51	.56	.52	.56	.47	.49
Third run, drs ....gal.	.52	.57	.56	.57	.51	.53
Rosins 600 lb bbls, 280 lb unit ex. yard NY:***						
B	...	5.00	5.00	6.25	4.60	5.45
D	...	5.05	5.05	6.25	4.95	5.70
E	...	5.35	5.35	6.55	5.20	6.40
F	...	5.75	5.75	6.85	5.50	6.75
G	...	5.72½	5.72½	6.90	5.75	7.00
H	...	5.70	6.07½	6.95	5.75	7.10
I	...	5.70	5.70	6.97½	5.77½	7.20

* Spot prices are ⅛c higher; *** May 31.

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Rosins (continued)						
K	...	5.85	5.85	7.00	5.80	7.20
M	...	6.25	6.25	7.02½	5.90	7.25
N	...	6.50	6.50	7.05	6.75	7.40
WG	...	6.80	6.80	7.12½	6.95	7.70
WW	...	7.20	7.20	7.60	7.45	8.50
Rosins, Gum, Savannah (280 lb unit):**						
B	...	3.60	3.60	4.80	3.25	4.00
D	...	3.65	3.65	4.80	3.55	4.30
E	...	3.95	3.95	5.15	3.80	5.00
F	...	4.35	4.35	5.45	4.00	5.35
G	...	4.35	4.35	5.50	4.40	5.70
H	...	4.35	4.35	5.55	4.40	5.70
I	...	4.35	4.35	5.57½	4.40	5.80
K	...	4.40	4.40	5.60	4.40	5.80
M	...	4.85	4.85	5.62½	4.40	5.85
N	...	5.20	5.20	5.65	5.10	6.00
WG	...	5.40	5.40	5.75	5.60	6.30
WW	...	5.80	5.80	6.20	6.05	7.10
X	...	5.90	5.90	6.20	5.60	7.10
Rosin, Wood, c-l, FF grade, NY	3.65	4.00	3.65	6.95	5.35	6.80
Rotten Stone, bgs mines ton	25.50	37.50	25.50	37.50	22.50	37.50
Imported, lump, bbls ... lb.	...	.14	...	.14	...	.14
Powdered, bbls ...... lb.	.08½	.10	.08½	.10	.08½	.10
S						
Sago Flour, 150 lb bgs .. lb.	.04	nom.	.04	.04½	.02½	.04½
Sal Soda, bbls wks ... 100 lb.	...	1.20	...	1.20	...	1.20
Salt Cake, 94-96%, c-l. bulk wks ...... ton	...	17.00	...	17.00	19.00	25.00
Chrome, c-l, wks ...... ton	...	16.00	11.00	16.00	11.00	12.00
Saltpetre, gran, 450-500 lb bbls ...... lb.	...	.071	...	.071	.06½	.069
Cryst, bbls ...... lb.	...	.081	...	.081	.07½	.0865
Powd, bbls ...... lb.	..	.081		.081	.07½	.079
Satin, White, pulp, 550 lb bbls ...... lb.	.01¼	.01½	.01¼	.01½	.01¼	.01½
Schaeffer's Salt, kgs ..... lb.	...	.46	.46	.48	.46	.48
Shellac, Bone dry, bbls .. lb. r	.25	.26	.25	.26	.18	.26
Garnet, bgs ...... lb.	...	.19½	.19	.23	.12½	.20
Superfine bgs ...... lb. s	.14½	.18	.14½	.20½	.10	.21
T. N., bgs ...... lb. s	.13½	.17	.13½	.19½	.09½	.20
Silver Nitrate, vials ..... oz.	...	.27⅜	.26⅞	.27⅜	.26⅞	.33½
Slate Flour, bgs, wks .... ton	9.00	10.00	9.00	10.00	9.00	10.00
Soda Ash, 58% dense, bgs, c-l, wks ...... 100 lb.	...	1.10	...	1.10	...	1.10
58% light, bgs ..... 100 lb.	1.05	1.08	1.05	1.08	...	1.08
blk ...... 100 lb.	...	.90	...	.90	...	.90
paper bgs ...... 100 lb.	...	1.05	...	1.05	...	1.05
bbls ...... 100 lbs.	...	1.35	...	1.35	...	1.35
Caustic, 76% grnd & flake, drs ...... 100 lb.	...	2.70	...	2.70	...	2.70
76% solid, drs .... 100 lb.	...	2.30	...	2.30	2.10	2.30
Liquid sellers, tks ... 100 lb.	...	1.95	1.95	1.97½	...	1.97½
Sodium Abietate, drs .... lb.	...	.11	...	.11	...	.11
Acetate, 60% tech, gran, powd, flake, 450 lb bbls wks ...... lb.	.04	.05	.04	.05	.04	.05
anhyd, drs, delv ..... lb.	.08½	.10	.08¼	.10	...	.08¼
Alginate, drs ...... lb.	.71	.96	.71	.96	.70	.95
Antimoniate, bbls ..... lb.	.14½	.15	.14½	.15	.11½	.16
Arsenate, drs ...... lb.	.07	.08¾	.07	.08¾	.08	.08½
Arsenite, liq, drs .... gal.	...	.35	...	.35	.30	.35
Dry, gray, drs, wks . lb.	.06½	.09¼	.06½	.09½	.07½	.09½
Benzoate, USP kgs ... lb.	.46	.50	.46	.52	.46	.48
Bicarb, powd, 400 lb bbl, wks ...... 100 lb.	...	1.70	1.70	1.85	...	1.85
Bichromate, 500 lb cks, wks* ...... lb.	.06⅞	.07¼	.06¾	.07¼	.06¾	.07¼
Bisulfite, 500 lb bbls, wks lb.	.03	.031	.03	.031	.031	.036
35-40% sol bbls, wks 100 lb.	1.30	1.80	1.40	1.80	1.40	1.80
Chlorate, bgs, wks .... lb.	...	.06¼	.06¼	.08½	.06¼	.07½
Cyanide, 96-98%, 100 & 250 lb drs, wks ..... lb.	.14	.15	.14	.15	.14	.15
Diacetate, 33-35% acid, bbls, lcl, delv ...... lb.	...	.09	...	.09	...	.09
Fluoride, white 90%, 300 lb bbls, wks ...... lb.	.07	.08	.07	.08	.07	.08¾
Hydrosulfite, 200 lb bbls, f.o.b. wks ...... lb.	.16	.17	.16	.17	.16	.17
Hyposulfite, tech, pea crys 375 lb bbls, wks 100 lb.	..	2.80	...	2.80	...	2.80
Tech, reg cryst, 375 lb bbls, wks ...... 100 lb.	2.45	...	2.45	2.80	2.45	2.80
Iodide, jars ...... lb.	...	2.30	...	2.30	...	2.30
Metal, drs, 280 lbs .... lb.	...	.19	...	.19	.	.19
Metanilate, 150 lb bbls . lb	.41	nom.	.41	.42	.41	.42
Metasilicate, gran, c-l, wks ...... 100 lb.	...	2.35	...	2.35	2.20	2.35
cryst, drs, c-l, wks 100 lb.	...	3.05	...	3.05	2.90	3.05
Monohydrated, bbls ... lb.	...	.023	...	.023	...	.023
Naphthenate, drs ...... lb.	.12	.19	.12	.19	.12	.19
Naphthionate, 300 lb bbl lb.	...	.50	...	.50	.50	.54
Nitrate, 92% crude, 200 lb bgs, c-l, NY ...... ton	...	28.30	...	28.30	...	28.30
100 bgs, same basis . ton	...	29.00	...	29.00	...	29.00
Bulk ...... ton	...	27.00	...	27.00	...	27.00
Nitrite, 500 lb bbls .... lb.	.06¾	.11½	.06¾	.11½	.06¾	.11½
Othochlorotoluene, sulfonate, 175 lb bbls, wks lb.	.25	.27	.25	.27	.25	.27
Orthosilicate, 300 lb drs, c-l ...... lb.	...	.03	...	.03	...	.03
Perborate, drs, 400 lb .. lb.	.14¾	.15¼	.14¾	.15¼	.14¾	.15¼
Peroxide, bbls, 400 lb .. lb.	...	.17	...	.17	...	.17

r Bone dry prices at Chicago 1c higher; Boston ½c; Pacific Coast 2c; Philadelphia deliveries f.o.b. N. Y.; refined 6c higher in each case; s T. N. and Superfine prices quoted f.o.b. N. Y. and Boston; Chicago prices 1c higher; Pacific Coast 3c; Philadelphia f.o.b. N. Y. *Spot price is ⅛c higher.

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Sodium (continued):						
Phosphate, di-sodium, tech, 310 lb bbls, wks 100 lb.	...	2.30	...	2.30	2.05	2.30
bgs, wks ......100 lb.	...	2.10	...	2.10	1.85	2.10
Tri-sodium, tech, 325 lb. bbls, wks ......100 lb.	...	2.45	...	2.45	2.20	2.45
bgs, wks ....100 lb.	...	2.25	...	2.25	2.00	2.25
Picramate, 160 lb kgs..lb.	...	.65	.65	.67	.65	.67
Prussiate, Yellow, 350 lb. bbls, wks ....lb.	.09½	.09¾	.09½	.09¾	.09½	.10¾
Pyrophosphate, anhyd, 100 lb bbls f.o.b. wks frt eq lb.	...	.0530	...	.0530	...	.0530
Sesquisilicate, drs, c-l, wks ....100 lb.	...	2.90	...	2.90	2.80	2.90
Silicate, 60°, 55 gal drs, wks ....100 lb.	1.40	1.80	1.40	1.80	1.65	1.70
40°, 55 gal drs, wks 100 lb	...	.80	...	.80	...	.80
tks, wks ......100 lb.	...	.65	...	.65	...	.65
Silicofluoride, 450 lb bbls NY ....lb.	no prices		no prices		.03½	.04¾
Stannate, 100 lb drs ...lb.	.31½	.34½	.31½	.34½	.30	.35
Stearate, bbls ....lb.	.19	.24	.19	.24	.19	.24
Sulfanilate, 400 lb bbls lb.	.16	.18	.16	.18	.16	.18
Sulfate, Anhyd, 550 lb bgs c-l, wks ....100 lb. ‡	1.45	1.65	1.45	1.90	1.45	1.90
Sulfide, 80% cryst, 440 lb. bbls, wks ....lb.	.02¼	.03	.02¼	.03	.02¼	.02½
Solid, 650 lb drs, c-l, wks ....lb.	.03	.03¾	.03	.03¾	.03	.03½
Sulfite, cryst, 400 lb bbls, wks ....lb.	.023	.0255	.023	.02½	.023	.02½
Sulfocyanide, drs ......lb.	.28	.47	.28	.47	.28	.47
Sulforicinoleate, bbls....lb.	...	.12	...	.12	...	.12
Supersilicate (see sodium sesquisilicate)						
Tungstate, tech, crys, kgs lb.	no prices		no prices		1.05	1.10
Sorbitol, com, solut, wks c-l, drs, wks ....lb.	.15½	.16	.15½	.16	...	.15½
Spruce, Extract, ord, tks..lb.	...	.01⅛	...	.01⅛	...	.01⅛
Ordinary, bbls .....lb.	...	.01⅝	...	.01⅝	...	.01⅝
Super spruce ext, tks...lb.	...	.01⅜	...	.01⅜	...	.01⅜
Super spruce ext, bbls..lb.	...	.01⅞	...	.01⅞	...	.01⅞
Super spruce ext. powd, bgs ....lb.	...	.04	...	.04	...	.04
Starch, Pearl, 140 lb bgs 100 lb.	...	2.80	2.50	2.80	2.40	2.85
Powd, 140 lb bgs ...100 lb.	...	2.90	2.60	2.90	2.50	2.90
Potato, 200 lb bgs .....lb.	.06	.06½	.05	.06½	.04	.06¾
Imp, bgs ....lb.	...	.06½	...	.06½	.05	.06½
Rice, 200 lb bbls ......lb.	nom.	.07½	.07¼	.07½	.06¼	.07¼
Sweet Potato, 240 lb bbls, f.o.b. plant ......100 lb.	nom.	6.00	5.50	6.00	5.50	7.50
Wheat, thick, bgs .....lb.	...	.05½	...	.05½	.05	.05½
Strontium, carbonate, 600 lb bbls, wks ....lb.	nom.	.23	.22	.23	.16	.24
Nitrate, 600 lb bbls, NY lb.	.07¾	.08¾	.07¾	.08¾	.07¾	.08¼
Sucrose, octa-acetate, den, grd, bbls, wks ......lb.	...	.45	...	.45	...	.45
tech, bbls, wks ....lb.	...	.40	...	.40	...	.40
Sulfur, crude, f.o.b. mines ton	...	16.00	...	16.00	...	16.00
Flour, com'l, bgs ...100 lb.	1.60	1.95	1.60	2.35	1.65	2.35
bbls ....100 lb.	1.95	2.70	1.95	2.70	1.95	2.70
Rubbermakers, bgs..100 lb.	...	2.00	2.00	2.80	2.20	2.80
bbls ....100 lb.	...	2.35	2.35	3.15	2.55	3.15
Extra fine, bgs .....100 lb.	...	2.35	2.85	3.00	2.85	3.00
Superfine, bgs .....100 lb.	2.65	2.80	2.65	2.80	2.65	2.80
bbls ....100 lb.	2.25	3.10	2.25	3.10	2.25	3.10
Flowers, bgs ......100 lb.	3.00	3.75	3.00	3.75	3.00	3.75
bbls ....100 lb.	3.35	4.10	3.35	4.10	3.35	4.10
Roll, bgs ....100 lb.	...	2.35	2.35	3.10	2.35	3.10
bbls ....100 lb.	2.85	3.25	2.50	3.25	2.50	3.25
Sulfur Chloride, 700 lb drs, wks ....lb.	.03	.08	.03	.08	.03	.04
Sulfur Dioxide, 150 lb cyl lb.	.07	.09	.07	.09	.07	.09
Multiple units, wks ....lb.	.04½	.07	.04½	.07	.04½	.07
tks, wks ....lb.	.04	.06	.04	.06	.04	.05
Refrigeration, cyl, wks lb.	.16	.17	.16	.17	.16	.17
Multiple units, wks ...lb.	.07½	.10	.07½	.10	.07½	.10
Sulfuryl Chloride ....lb.	.15	.40	.15	.40	.15	.40
Sumac, Italian, grd .....ton	...	140.00	98.00	140.00	65.50	85.00
Extract, 42°, bbls .....lb.	.06	.06¼	.06	.06¼	.05¼	.06¼
Superphosphate, 16% bulk, wks ....ton	...	9.00	...	9.00	8.00	9.00
Run of pile ....ton	...	8.50	...	8.50	7.50	8.50
Triple, 40-48%, a.p.a. bulk, wks, Balt. unit .....ton	...	.70	...	.70	...	.70
T						
Talc, Crude, 100 lb bgs, NY ton	14.00	16.00	14.00	15.00	13.00	15.00
Ref'd 100 lb bgs, NY ton	15.00	17.00	14.00	17.00	14.00	16.00
French, 220 lb bgs, NY ton	23.00	35.00	23.00	35.00	23.00	30.00
Ref'd, white bgs, NY ton	45.00	60.00	45.00	60.00	45.00	60.00
Italian, 220 lb bgs to arr ton	64.00	67.00	64.00	70.00	60.00	70.00
Ref'd', white bgs, NY ton	67.00	78.00	65.00	78.00	65.00	70.00
Tankage, Grd, NY ...unit ʉ	...	2.85	2.85	3.25	2.75	3.25
Ungrd ....unit ʉ	...	2.85	2.85	3.25	2.75	5.00
Fert grade, f.o.b.Chgo unit ʉ	...	2.85	2.85	3.50	2.50	4.50
South American cif unit ʉ	...	3.00	3.00	3.50	3.00	4.00
Tapioca Flour, high grade, bgs ....lb.	.03	.04½	.02¾	.04½	.01¾	.05½
Tar Acid Oil, 15%, drs..gal.	.22	.24	.22	.24	.21	.24
25% drs ....gal.	.26	.28	.26	.28	.25	.28
Tar, pine, delv, drs......gal.	.26	.27	.26	.27	.25	.27
tks, delv, E. cities ....gal.	...	.21	...	.21	.20	.21
Tartar Emetic, tech, bbls lb.	.34¾	nom.	.34¾	.35	.27¾	.35
USP, bbls ....lb.	.40	nom.	...	.40	.33	.40
Terpineol, den grade, drs lb.	...	.17	...	.17	...	.17
Tetrachlorethane, 650 lb drs lb.	.08	.08½	.08	.08½	.08	.08½
Tetrachlorethylene, drs, tech lb.	.08	.09	.08	.09½	...	.09½
Tetralene 50 gal drs, wks lb.	...	.12	.12	.13	.12	.13
Thiocarbanilid, 170 lb bbls lb.	...	.24	.20	.25	.20	.25

‡ Bags 15c lower; ʉ + 10.

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Tin, crystals, 500 lb bbls, wks lb.	(May 31)	.40½	.36	.40½	.35½	.39
Metal, NY ....lb.	* ...	.55	.45½	.55	.45½	.60
Oxide, 300 lb bbls, wks lb.	‡ About	.63	.51	.53	.50	.54
Tetrachloride, 100 lb drs, wks ....lb.	...	.26½	.23	.26½	.23	.32
Titanium Dioxide, 300 lb bbls lb.	.13¼	.14	.13	.16	.13¼	.16
Barium Pigment, bbls ..lb.	.05¼	.06½	.05¼	.06½	.05⅝	.06½
Calcium Pigment, bbls lb.	.05	.06¼	.05	.06¼	.05⅜	.06½
Titanium tetrachloride, drs. f.o.b. Niagara Falls ....lb.	.32	.45	.32	45	.32	.45
Titanium trichloride 23% sol. bbls f.o.b. Niagara Falls lb.	.22	.26	.22	.26	.22	.26
20% solution, bbls ....lb.	.175	.215	.175	.215	.175	.215
Toluidine, mixed, 900 lb drs, wks ....lb.	..	.26	.26	.27	.26	.27
Toluol, 110 gal drs, wks gal.	...	.30	.27	.30	...	.27
8000 gal tks, frt all'd gal.	...	.25	.22	.25	...	.22
Toner Lithol, red, bbls..lb.	.55	.60	.55	.60	.55	.80
Para, red, bbls ....lb.	.70	.75	.70	.75	.70	.80
Toluidine, bgs ....lb.	...	1.05	1.05	1.35	...	1.35
Triacetin, 50 gal drs, wks, lb.	...	.26	...	.26	...	.26
Triamyl Borate, lcl, drs, wks lb.	...	.27	...	.27	...	.27
Triamylamine, c-l, drs, wks lb.	...	.77	...	.77	.77	1.25
lcl, wks, drs ....lb.	.78	.80	.78	.80	...	...
tks, wks ....lb.	...	.75	...	.75	...	...
Tributylamine, lcl, drs, wks lb.	.68	.70	.68	.70	...	.70
c-l, drs, wks ....lb	...	.67	...	.67	...	...
tks, wks ....lb.	...	.65	...	.65	...	...
Tributyl citrate, drs, frt all'd lb.	.24	.26	.24	.35	.35	.45
Tributyl Phosphate, frt all'd lb.	...	.42	...	.42	...	.42
Trichlorethylene, 600 lb drs, frt all'd E. Rocky Mts lb.	.08	.09	.08	.09	.08	.09½
Tricresyl phosphate, tech, drs, lb.	.22	.36½	.22	.36½	.22	.37½
Triethanolamine, 50 gal drs wks ....lb.	...	.19	.19	.22	.21	.22
tks, wks ....lb.	...	.18	.18	.20	...	.20
Triethylamine, lcl, drs, f.o.b. wks ....lb.	...	1.05	...	1.05	...	...
Triethylene glycol, drs, wks lb.	...	.26	...	.26	...	.26
Trihydroxyethylamine Oleate, bbls ....lb.	...	.30	...	.30	...	.30
Stearate bbls ....lb.	...	.30	...	.30	...	.30
Trimethyl Phosphate, drs, lcl, f.o.b. dest ....lb.	...	.50	...	.50	...	.50
Trimethylamine, c-l, drs, frt all'd E. Mississippi ...lb.	...	1.00	...	1.00	...	1.00
Triphenylguanidine, ...lb.	.58	.60	.58	.60	.58	.60
Triphenyl Phosphate, drs lb.	...	.38	...	.38	...	.38
Trinoli, airfloated, bgs, wks ton	...	26.00	26.00	30.00	26.00	30.00
Turpentine (Spirits), c-l, NY dock, bbls ....gal.	...	.33**	.33	.40	.29	.35
Savannah, bbls ....gal.	...	.27*	.27	.34	.23½	.29
Jacksonville, bbls .....gal.	no prices		.26	.34¾	.23½	.26¾
Wood Steam dist, drs, c-l, NY ....gal.	...	.28	.28	.34½	.242	.34
Wood, dest dist, l-c-l, drs, delv E. cities ......gal.	...	.31	.23	.31	.22	.25
U						
Urea, pure 112 lb cases lb.	...	.12	.12	.15½	.14½	.15½
Fert grade, bgs, c. i. f. S.A. points ....ton	95.00	101.00	95.00	110.00	95.00	110.00
Dom f.o.b., wks ......ton	...	85.00	85.00	101.00	95.00	101.00
Urea Ammonia, liq., nitrogen basis ....ton	...	121.50	...	121.50	...	...
V						
Valonia beard, 42%, tannin bgs ....ton	...	49.00	47.00	54.00	45.00	57.00
Cups, 32% tannin bgs..ton	38.00	39.00	33.00	39.00	27.00	39.00
Extract, powd, 63% ...lb.	.0565	nom.	.0565	.06	.05	.06
Vanillin, ex eugenol, 25 lb tins, 2000 lb lots ....lb.	...	2.60	...	2.60	2.20	2.60
Ex-guaiacol ....lb.	...	2.50	...	2.50	2.10	2.50
Ex-lignin ....lb.	...	2.50	...	2.50	2.10	2.50
Vermilion, English, kgs...lb.	no prices		...	2.76	1.50	2.97
W						
Wattle Bark, bgs ....ton	34.00	33.75	34.00	38.75	34.50	40.00
Extract, 60°, tks, bbls..lb.	...	.04¼	...	.04¼	.04	.05½
Wax, Bayberry, bgs .....lb.	.22	.23	.25	.30	.16⅞	.39
Bees, bleached, white 500 lb slabs, cases ......lb.	...	.35	.35	.38	.33	.40½
Yellow, African, bgs..lb.	.23	.23½	.23	.28	.18½	.30
Brazilian, bgs .....lb.	.24	.24½	.24	.29	.21	.33
Refined, 500 lb slabs, cases lb.	.29	.31	.29	.36	.25½	.36
Candelilla, bgs ....lb.	.18½	.19	.18	.19	.15¼	.19
Carnauba, No. 1, yellow, bgs ....lb.	.74	.75	.69	.85	.36¾	.78
No. 2, yellow, bgs...lb.	.73	.74	.68	.84	.35¾	.45
No. 2, N. C., bgs ...lb.	.67	.68	.46	.73	.34	.41
No. 3, Chalky, bgs ...lb.	.58	.59	.43	.66	.27½	.46
No. 3, N. C., bgs ...lb.	.61	.62	.47	.68	.28¾	.49
Ceresin, dom, bgs .....lb.	.11½	.12	.11½	.15	.08½	.15
Japan, 224 lb cases ....lb.	.15½	.16	.15½	.16½	.09¾	.18
Montan, crude, bgs ....lb.	no prices		no prices		.11	.11¾
Paraffin, see Paraffin Wax.						
Spermaceti, blocks, cases lb.	.22	.23	.22	.25	.18	.25
Cakes, cases ....lb.	.23	.24	.23	.25	.19	.26
Whiting, chalk, com 200 lb bgs, c-l, wks ....ton	16.00	20.00	12.00	20.00	12.00	14.00
Gilders, bgs, c-l, wks..ton	...	18.00	15.00	18.50	...	15.00
Wood Flour, c-l, bgs ....ton	24.00	25.00	20.00	30.00	20.00	30.00
Xylol, frt all'd, East 10° tks, wks ....gal.	...	.30	...	.30	.29	.30
Com'l tks, wks, frt all'd, gal	...	.27	...	.27	.26	.27
Xylidine, mixed crude, drs lb.	.35	.36	.35	.36	.35	.36
Zein, bgs, 1000 lb lots, wks ....lb.	...	.20	...	.20	...	...

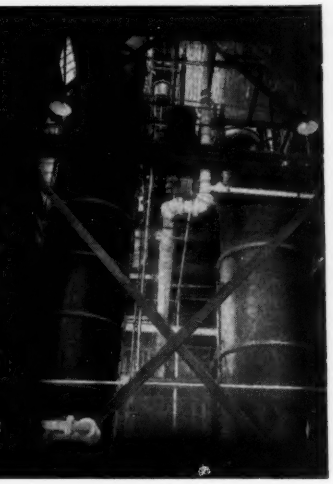
* May 31. ** May 31. ‡ May 31.

Current

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Zinc Acetate, tech, bbls, lcl, delv ... lb.	.15	.16	.15	.16	.15	.21
Arsenite, bgs, frt all'd .. lb.	...	.12	.12	.12½	.12	.13
Carbonate tech, bbls, NY lb.	.14	.16	.14	.16	.14	.15
Chloride fused, 600 lb drs, wks ... lb.	...	.04¼	.04¼	.046	.04¼	.046
Gran, 500 lb drs, wks lb.	...	.05	.05	.05¾	.05	.05¾
Soln 50%, tks, wks 100 lb.	...	2.25	...	2.25	...	2.25
Cyanide, 100 lb drs ... lb.	...	.33	...	.33	...	.33
Dust, 500 lb bbls, c-l, delv lb.	...	.08	.07½	.08	.06½	.08½
Metal, high grade slabs, c-l, NY ... 100 lb.	...	6.39	5.90	6.39	4.84	6.40
E. St. Louis ... 100 lb.	...	6.00	4.60	6.00	4.60	6.00
Oxide, Amer, bgs, wks lb.	.06½	.07½	.06¼	.07½	.06¼	.07½
French 300 lb bbls, wks lb.	.06¼	.07½	.06½	.07¾	.06½	.07¾
Palmitate, bbls ... lb.	.24½	.27½	.23	.27½	.23	.25
Resinate, fused, pale bbls lb.	...	.10	...	.10	...	.10
Stearate, 50 lb bbls ... lb.	...	.23	.21½	.24½	.20	.24½
Sulfate, crys, 400 lb. bbls wks ... lb.	...	.0275	.0275	.029	...	.029
Flake, bbls ... lb.	...	.0325	...	.0325	...	.0325
Sulfide, 500 lb bbls, delv lb.	...	.07¾	.07¾	.08	.07¾	.08⅞
bgs, delv ... lb.	...	.07½	.07½	.07¾	.07½	.08⅝
Sulfocarbolate, 100 lb kgs lb.	.24	.26	.24	.26	.24	.26
Zirconium Oxide, crude, 73-75% grd, bbls, wks ton	75.00	100.00	75.00	100.00	75.00	100.00

Oils and Fats

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Babassu, tks, futures ... lb.	nom.	.06	.06	.06⅝	.05⅞	.07⅝
Castor, No. 3, 400 lb drs lb.	nom.	.12	.12	.12¾	.08¼	.12¾
Blown, 400 lb drs ... lb.	nom.	.14¾	...	.14¾	.10¼	.14¾
China Wood, drs, spot NY lb.	.22½	.26½	.22½	.28	.15	.28
Tks, spot NY ... lb.	.21½	.25½	.21½	.27	.14½	.27
Coconut, edible, drs NY .. lb.	...	.07⅝	.07⅝	.09⅜	.08⅛	.10⅛
Manila, tks, NY ... lb.	...	.04	.03	.03⅜	.02⅞	.04⅝
Tks, Pacific Coast ... lb.	.02⅝	.02¾	.02⅝	.03½	.02⅝	.04⅜
Cod, Newfoundland, 50 gal bbls ... gal.	.65	nom.	.65	.72	.29	.72
Copra, bgs, NY ... lb.	.0185	.0190	.0165	.0190	.0160	.2625
Corn, crude, tks, mills ... lb.	.05¾	.06	.05¾	.06½	.05⅛	.07⅛
Refd, 375 lb bbls, NY .. lb.	.08½	.08¾	.08½	.09	.07½	.09¾
Degras, American, 50 gal bbls NY ... lb.	.08½	.09½	.08½	.10	.07	.10
English, bbls ... lb.	.08½	.09½	.08½	.10	.07	.10
Greases, Yellow ... lb.	.04⅝	.04¾	.04⅝	.05¼	.03⅞	.06¾
White, choice, bbls, NY lb.	.05⅛	.05¼	.05⅛	.05⅝	.04½	.07½
Lard, Oil, edible, prime .. lb.	...	.09½	.09¼	.10	.09	.11¼
Extra, bbls ... lb.	...	.08⅜	.08⅜	.09⅜	.08	.10⅜
Extra, No. 1, bbls ... lb.	...	.08¼	.08¼	.08⅞	.07¾	.10⅛
Linseed, Raw less than 5 bbl lots ... lb.	...	.11	.110	.116	.092	.119
bbls, c-l, spot ... lb.	.102	.104	.102	.110	.084	.111
Tks ... lb.	.096	.098	.096	.104	.078	.104
Menhaden, tks, Baltimore gal.	.35	nom.	.32	.35	.21	.35
Refined, alkali, drs ... lb.	...	.079	.071	.079	.062	.082
Tks ... lb.	...	.067	...	.067	.056	.076
Kettle boiled, drs ... lb.	...	.091	...	.093	.074	.094
Light pressed, drs ... lb.	...	.073	...	.075	.056	.076
Tks ... lb.	...	.067	...	.069	.067	.069
Neatsfoot, CT, 20°, bbls, NY lb.	...	.16¾	.16¾	.19¼	.14¾	.19¾
Extra, bbls, NY ... lb.	...	.08¼	.08¼	.09	.08	.10⅛
Pure, bbls, NY ... lb.	...	.12¼	.12¼	.14¼	.10¾	.16¾
Oiticica, bbls ... lb.	.17	.18	.17	.21	.09¼	.21
Oleo, No. 1, bbls, NY ... lb.	...	.07½	.07¼	.07¾	.07¼	.12
No. 2, bbls, NY ... lb.	...	.07¼	.07	.07½	.06¾	.11¾
Olive, denat, bbls, NY .. gal.	...	1.25	.94	1.25	.82	1.40
Edible, bbls, NY ... gal.	2.00	2.10	1.85	2.00	1.75	2.25
Foots, bbls, NY ... lb.	...	.08¾	.08	.08¾	.06¾	.10
Palm, Kernel, bulk ... lb.	no prices		no prices		.034	.036
Niger, cks ... lb.	...	.04½	.04⅜	.05½	.03⅝	.05½
Sumatra, tks ... lb.	...	.02½	.03	nom.	.0265	.02¾
Peanut, crude, bbls, NY lb.	.07¼	.07⅜	.06¾	.07⅜	.06	.08
Tks, f.o.b. mill ... lb.	nom.	.05⅞	.05⅞	.07⅛	.05¼	.07¼
Refined, bbls, NY ... lb.	.08⅞	.09⅛	.08¼	.09¾	.08¾	.10¾
Perilla, drs, NY ... lb.	.19	nom.	.19	.21	.09½	.16½
Tks, Coast ... lb.	.18	nom.	.18½	.20	.089	.15¾
Pine, see Pine Oil, Chem. Sec.						
Rapeseed, blown, bbls, NY lb.	.17	.17½	.17	.17½	.14	.17½
Denatured, drs, NY .. gal.	1.10	1.15	1.00	1.05	.80	1.05
Red, Distilled, bbls ... lb.	.07½	.08½	.07½	.09½	.06¾	.09½
Tks ... lb.	...	.07	.07	.08	.064	.08½
Sardine, Pac Coast, tks .. gal.	.45	nom.	.37	.39	.24	.38
Refined alkali, drs ... lb.	...	.079	...	.081	.062	.082
Tks ... lb.	...	.073	...	.075	.056	.076
Light pressed, drs ... lb.	...	.073	...	.075	.056	.076
Tks ... lb.	...	.067	...	.069	.05	.07
Sesame, white, dom ... lb.	.16	nom.	.11½	.11¾	.09	.12
Soy Bean, crude Dom, tks, f.o.b. mills .. lb.	...	.05⅞	.05⅞	.06¼	.04½	.06½
Crude, drs, NY ... lb.	.06⅝	.07⅜	.06¼	.07¾	.05⅛	.07⅝
Ref'd, drs, NY ... lb.	.07⅝	.07¾	.07⅝	.08½	.06⅜	.09
Tks ... lb.	.06⅞	.07	.06⅞	.07⅝	.05¾	.07¾
Sperm, 38° CT, bleached bbls, NY ... lb.	...	.108	.105	.108	.09	.103
45° CT, blchd, bbls, NY, .. lb.	...	.101	.098	.101	.083	.096
Stearic Acid, double pressed dist bgs ... lb.	.10½	.11½	.10½	.13	.10	.13½
Double pressed saponified bgs ... lb.	.10¾	.11¾	.10¾	.13¾	.10¼	.13¾
Triple pressed dist bgs lb.	.13½	.14½	.13¼	.16½	.12¾	.16½
Stearine, Oleo, bbls ... lb.	.06	.06¼	.06	.06½	.05½	.12
Tallow City, extra loose .. lb.	nom.	.04½	.04½	.05⅜	.04⅜	.07
Edible, tierces ... lb.	nom.	.04½	.04½	.05¾	.04½	.07¾
Acidless, tks, NY ... lb.	...	.07½	.07½	.08	.07	.09¼
Turkey Red, single, drs ... lb.	...	.087	.082	.09	.06	.08⅝
Double, bbls ... lb.	...	.11¼	.11	.12¾	.08¾	.11¼
Whale:						
Winter bleach, bbls, NY lb.	...	095	...	.095	.075	.095
Refined, nat, bbls, NY .. lb.	...	.091	...	.091	.071	.091



PROFESSIONAL DIRECTORY

BOOKLETS AND CATALOGS

Chemicals

A181. Better Paints and Materials for Better Maintenance; 16-page catalog of various types of paint, such as acid and alkali resisting, concrete and masonry, heat resisting, and several other important products for industrial maintenance. The Skybryte Co.

A182. Correcting Leakage; 20-page booklet incorporates in compact form all the essential facts presented in previous bulletins and technical papers on subject "Correcting Leakage in Gas Distribution Systems with 'Carboseal' Anti-Leak," together with additional information for the benefit of users and prospective users of "Carboseal" Anti-Leak. Carbide and Carbon Chemicals Corp.

A183. Cry-O-Vac Protection; Special folder describing the application of CRY-O-VAC to the fields of food preservation and storage. Dewey and Almy Chemical Co.

A184. Hot Weather Safety Aids and Hygiene; Pamphlet giving health rules and suggestions to minimize heat hazards among workers. Pulmosan Safety Equipment Corp.

A185. Petronate and Petromix; 5-page bulletin describing the use of highly refined petroleum sulfonates and soluble oil bases in manufacture of soluble wool oils, cordage oils, emulsion polishes, etc. L. Sonneborn Sons, Inc.

A186. Plastikon Rubber Putty; Catalog supplying information on the properties and uses of this product in building and industry. B. F. Goodrich Co.

A187. Polyvinyl Alcohols. A technical bulletin giving the properties and suggested uses for this new series of alcohols. Du Pont de Nemours & Co., Inc.

A188. Revertex; 18-page booklet devoted to the treatment, use, and general information concerning concentrated rubber latex. Revertex Corp. of Amer.

A189. Solvay Calcium Chloride; 22-page booklet listing and illustrating the use of this salt for protection from dust. Solvay Sales Corp.

A190. Triton 720; A study of detergent activity with special reference to "Triton 720." This new material is a synthetic detergent developed by research to give maximum scouring and cleansing properties. The study concerns itself with the following main topics, wetting, adsorption, preferential wetting, emulsification, deflocculation, rinsing, and applications. Rohm & Haas Co.

A191. Xynomines; 36-page booklet by Dr. Hugh H. Mosher gives comprehensive discussion of the xynomines (sulfated boro amide esters of aliphatic compounds, containing between 12 and 18 carbon atoms). Includes various uses, composition, action under various conditions and with various materials. Onyx Oil & Chemical Co.

Equipment—Containers

E266. Balanced-Action Diaphragm Packless Valves; Folder supplies illustrated explanation of operation of this type of valve, describes various types and gives specifications. Henry Valve Co.

E267. Boiler and Tank Accessories; Catalog devoted to the complete presentation of accessories for fired and unfired pressure vessels. A reference book for anyone who specifies or buys this type of equipment. Steel Improvement & Forge Co.

E268. Broadside N-33; Special effort to picture and describe briefly the complete line of industrial temperature instruments—to compress into a single handy sheet the essential data which otherwise could be obtained only by thumbing through a number of catalogs. Leeds & Northrup Co.

E269. Dry Type Transformers; 16-page leaflet describing line of transformers, autotransformers, boosters, and phase changing transformers for applications where small KVA sizes are required, and where space limitations and insurance regulations prohibit the use of oil insulated apparatus. Westinghouse Electric & Manufacturing Co.

E270. Electrodes; General information on carbon electrodes, details of the products and stocks of the company. Also useful compilation of chemical, physical and engineering data. Great Lakes Carbon Corp.

E271. Electromet Review; Contains several short items on the applications of stainless steels. Electro Metallurgical Co.

E272. First Facts; Spring issue, 1940. Illustrates and describes many types of equipment handled by this company. Also gives large list of guaranteed rebuilt equipment ready for inspection and immediate delivery. First Machinery Corp.

E273. Fittings; 40-page booklet describing and illustrating many types of fittings. Also gives tables containing useful information such as, friction in pipes, surfaces and capacities of pipes, weights and measures, building data, etc. Pittsburgh Brass Manufacturing Co.

E274. Handling and Unloading Plants for Liquefied Gases; 12-page booklet announcing decision to supply complete line of bulk plants for the unloading and storage of liquefied gases, contains several flow sheets of typical layouts, illustrations of installations and equipment, general information and list of thermodynamic properties of several gases. Blaw-Knox Co.

E275. Kovenews; 8-page booklet containing article on "The A. S. M. E. Code and Built-Up Welded Construction," descriptions and illustrations of various pieces of equipment, and other items of general interest. L. O. Koven & Bro., Inc.

E276. Labor Saver; Illustrates and describes the use of the company's equipment in solving many conveying, material handling, and screening problems. Stephens-Adamson Mfg. Co.

E277. Neoprene Stoppers; Folder containing descriptive matter and prices concerning laboratory stoppers made of neoprene. R. W. Rhoades Metaline Co., Inc.

E278. Safety Clothing; Illustrated catalog features outstanding, widely used and approved industrial safeguards from a line of more than 3800 items. It shows many of the latest ideas in gloves, mitts, finger guards, arm protectors, aprons, leggings, and welder's equipment. Industrial Gloves Corp.

E279. Sugar Factory Equipment; 96-page, illustrated catalog illustrates, describes and gives specifications for the company's broad line of mechanical handling and power transmitting equipment for sugar factories. Link-Belt Co.

E280. Synchronous Motors; Bulletin covering detail construction, is well illustrated with interesting views of many significant installations. Shows various types of construction used in number of different applications. The bulletin is made complete by covering types of starting equipment, including metal-clad and cubicle switchgear. Allis-Chalmers Mfg. Co.

E281. The Bottling Engineer Handbook; Illustrated, descriptive index of the many different machines manufactured by the company for the packaging of liquid, semi-liquid and semi-solid products in glass, tin and other containers. Contains specifications, several pages of engineering data. Was prepared to assist the buyer to compare the different types, styles and designs. U. S. Bottlers Machinery Co.

E282. The Working of S.A.E. Nickel Alloy Steels; Data compiled from practice of 34 leading fabricators. Covers effects of alloying elements, characteristics, applications and heat treatment. Also practical instructions for machining broaching, drilling, tapping, threading, milling, sawing, grinding, welding, and gas cutting. The International Nickel Co., Inc.

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Index to Advertisers

Index to Advertisers

"We"—Editorially Speaking

We can guarantee there will be no "summer dullness" in "C.I." during the warm summer months ahead. Dr. L. W. Bass, assistant director of Mellon, has prepared an exceptionally fine, thought-provoking article, "Pure and Applied Research." In the "Wealth From Waste" series F. E. Traflet, vice-president of the Pequanoc Rubber, will tell the absorbing story of "Reclaimed Rubber—A Little Publicized Source of Supply." Members of the technical staff of Mathieson Alkali are busy preparing a review of their new interesting bleaching agent sodium chlorite. "Modern Welding Practices in Chemical Plants" will be the lead feature in the Plant Operation and Management Section. Of course, all our feature columnists will continue—R. W. Lahey on packaging; Russell Kent on Washington; A. D. McFadyen on Personalities in Chemistry; and T. E. R. Singer on foreign literature.

One of the highlights of the DuPont World Fair preview not on the program was Dr. Charles M. A. Stine being informed by the young lady issuing the gifts of nylon stockings that, lacking a letter of identification, he would have to have Frank Byrne of the Publicity Department identify him. Such is fame!

And like the really big man that he is he saw the humorous side of the situation.

But was the young lady's face red when she heard who Dr. Stine was.

The palm this month goes to R. B. MacMullin of Mathieson Alkali's Niagara Falls Research Department and his co-workers on the general committee of the Western N. Y. section of the A.I.Ch.E. for the splendid job of arrangements at the Buffalo meeting last month.

Final registration figure at Buffalo was 539—three over the former record attendance reached at the Philadelphia meeting. Next stop, New Orleans.

As yet H. O. Chute has given no satisfactory excuse for his absence from the Buffalo meeting. He refuses to talk.

We have been basely accused of having had inside information direct from Herr Hitler on the date set for his most recent "blitzkrieg" because we scheduled Major Hooker's article "Industrial Mobilization —If War Comes" in the May issue.

Included in the list of dailies and magazines requesting permission to reprint Major Hooker's timely articles was the *Tacoma Daily Times Tribune*, leading newspaper in his home town.

A. M. Taylor reports that there is a movement in Washington to draft all men over 60 if we enter the war. Object—to save the Social Security Act.

We wonder where the *New York Times* got its "inside" misinformation about caffeine. Reported the *Times*—"Most of the caffeine used here normally has been manufactured in the Netherlands from cocoa beans imported from the East Indies. There is some capacity for extraction of the caffeine here, but not in sufficient quantities to meet the needs of the domestic market," it was said. Of course, the fact is that not only do we have manufacturing facilities to take care of our domestic needs, but usually have an exportable surplus.

And there was that special dispatch from Washington under date of May 23 in the same paper that reported among other things that "synthetic quinine can be made in the United States." Pretty dark secret, if it can. The same dispatch contains the interesting statement that "The Bethlehem Steel Works is believed to be considering the manufacture of toluol, needed for explosives, as a by-product."

Fifteen Years Ago

From Our Files of 15 Years Ago

The Manufacturing Chemists' Association, at annual convention at the Whitehall Club, New York, elects Elon H. Hooker, president. In his address the new president spoke on the vital necessity of the chemical industry to every other industry in peace, and to a still greater extent in time of war.

Two scholarships worth $900 will be awarded by the Chemists' Club of New York to students in industrial chemistry and chemical engineering. They are the Bloede scholarship and the Hoffmann scholarship.

The National Fertilizer Association and the Southern Fertilizer Association are holding a meeting at White Sulphur Springs, W. Va., for purpose of forming new association whose scope will include the fields now covered by the two.

If the council of National Defense, created in 1916, was restored to life in 1940, it would include in its membership with a controlling vote Secretaries Wallace, Ickes, Perkins and Hopkins. The only one missing would be Tommy ("the Cork") Corcoran. Or would he? And it would have the power to appoint subordinate bodies or committees, such as the War Industries Board of world war fame!

Dr. Francis Cowles Frary, author of the paper "Aluminum Equipment and the Chemical Industry" (page 714), was born in Minneapolis in 1884. He did his undergraduate work at the University of Minnesota and received his Ph.D. from the same institution in '12. Dr. Frary also studied at the University of Berlin '06-07. After a period of teaching at Minnesota Dr. Frary became a research chemist with Oldbury Electrochemical for two years. In '19 he became director of research of the Aluminum Co. of America, the position he now holds. He was a major in the Chemical Warfare Service during the world war. He is a past president of the Electrochemical Society and recipient of the Society's Acheson Medal in '39.

Orchids to "Monsanto Magazine" and its editor, Howard A. Marple, for a very fine dramatization of "hidden taxes" in the May issue. By all means see a copy.

The receptionist at the offices of the Neville Co., Pittsburgh, offered us a mimeograph sheet on the occasion of our last visit reading in part as follows:

You are welcome to our office and we appreciate your visiting us. We want you to feel that you are a welcome guest, and various magazines are laid out for your use. Most of all, we want to meet you quickly and transact the business for which you came—with the utmost dispatch and good will. We, too, employ salesmen and field men, and are well aware that your time costs money.

Mention is made that samples of the company's products and descriptive literature are readily available, and space is provided for the visitor to list the names of persons who might be interested in Neville products. Not an original idea by any means, but one that might be more widely adopted by industry generally.

"Baa, Baa," said the 84 goats after coming through unscathed from detonating waves supposed to be developed by Lester Barlow's highly publicized liquid oxygen-carbon explosive. If the goats could have been a little more articulate they probably would have added "Phooie."

State of Chemical Trade

Current Statistics (May 31, 1940)—p. 59

WEEKLY STATISTICS OF BUSINESS

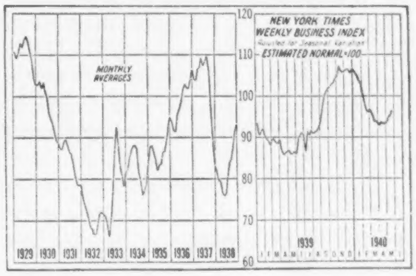
Week Ending	Carloadings 1940	Carloadings 1939	Carloadings % of Change	Electrical Output* 1940	Electrical Output* 1939	Electrical Output* % of Change	Jour. of Com. Price Index	Nat'l Chem. & Drugs	Fertilizer Fats & Oils	Ass'n Price Indices Fert. Mat.	Ass'n Price Indices Mixed Fert.	Ass'n Price Indices All Groups	†Labor Dept. Chem. & Drug Price Index	% Steel Activity	N. Y. Times Index Bus. Act.	Fisher Commodity Index
April 27....	644,520	585,190	+10.1	2,397,626	2,182,727	+ 9.8	81.4	94.5	52.4	73.0	78.1	77.8	77.0	61.8	93.1	84.6
May 4....	665,510	572,025	+16.3	2,386,210	2,163,538	+10.3	81.0	94.5	51.9	73.0	78.1	77.3	76.8	65.8	93.6	84.3
May 11....	680,657	554,644	+22.7	2,387,566	2,170,750	+10.0	81.3	95.0	51.5	72.9	78.1	77.2	76.8	70.0	94.7	84.0
May 18....	678,971	612,888	+10.8	2,422,212	2,170,496	+11.6	79.3	95.0	49.6	72.9	77.4	76.5	76.8	73.0	95.4	84.0
May 25....	687,490	623,542	+10.2	2,448,865	2,204,858	+11.1	79.1	95.0	46.3	72.6	77.4	75.7	76.6	76.9	96.5	83.4

* K.W.H. 000 omitted; † 1926-1928 = 100.00.

MONTHLY STATISTICS

CHEMICAL:	April 1940	April 1939	March 1940	March 1939	Feb. 1940	Feb. 1939
Acid, sulfuric (expressed as 50° Baumé, short tons, Bureau of the Census)						
Total prod. by fert. mfrs.	192.846	145,689	196.290	169,952	212,719	169,769
Consumpt. in mfr. fert.	140,272	112,593	149,303	119,081	158,592	138,273
Stocks end of month	94,820	90,458	93,231	94,529	93,132	92,163
Alcohol, Industrial (Bureau Internal Revenue)						
Ethyl alcohol prod., proof gal..	20,217,860	17,857,461	20,983,157	17,438,065	20,381,272	14,650,062
Comp. denat. prod., wine gal ..	267,687	240,918	413,609	504,865	453,848	339,343
Removed, wine gal.	230,577	184,314	403,640	480,384	412,653	361,310
Stocks end of mo., wine gal...	378,239	511,723	340,798	456,116	327,350	432,644
Spec. denat. prod., wine gal. ..	9,726,116	7,477,594	9,110,798	7,110,718	8,005,829	6,106,587
Removed, wine gal.	9,562,558	7,338,850	9,094,261	7,097,868	8,092,437	6,197,035
Stocks end of mo., wine gal...	1,212.438	972,979	1,051,625	837,796	1,038,272	827,846
Ammonia sulfate prod., tons *a*..	54,570	39,635	56,059	46,67(	53,884	41,780
Benzol prod., gal. *b*	9,588,000	6,813,000	9,952,000	8,063,000	9,695,000	7,141,000
Byproduct coke prod., tons *a*...	3,984,347	2,914,660	3,037,336	1,705,874	4,016,742	3,077,854
Cellulose Plastic Products (Bureau of the Census)						
Nitrocellulose sheets, prod., lbs.	532,327	802,067	789,307	917,274	723,107	712,212
Sheets, ship., lbs.	561,119	663,460	607,267	818,229	594,261	698,393
Rods, prod., lbs.	245,078	255,918	231,297	311,893	246,298	267,790
Rods, ship., lbs.	231,937	238,098	255,511	290,064	257,399	230,625
Tubes, prod., lbs.	74,649	58,420	69,036	85,841	46,797	69,293
Tubes, ship., lbs.	55,106	48,521	61,739	62,749	66,739	48,273
Cellulose acetate, sheets, rod, tubes						
Production, lbs.	558,358	508,264	550,138	1,077,560	636,834	988,719
Shipments, lbs.	490,206	522,346	588,516	1,029,302	655,076	1,014,295
Molding comp., ship.; lbs. ..	903,785	599,609	1,021,579	809,718	877,685	770,006
Methanol (Bureau of the Census)						
Production, crude, gals.	441.888	389.423	506,937	364,500	446,815	336,157
Production, synthetic, gals.	3,486,233	2,276,385	3,462,946	2,406,564	3,782,402	2,267,339
Pyroxylin-Coated Textiles (Bureau of the Census)						
Light goods, ship., linear yds...	2,859,620	2,642,840	2,793,435	3,108,289	2,744,749	3,005,939
Heavy goods, ship., linear yds...	2,146,261	1,933,597	2,184,457	2,396,423	2,116,841	2,113,036
Pyroxylin spreads, lbs. *c*	4,772,332	4,642,742	4,769,189	5,401,941	4,930,415	5,079,315
Exports (Bureau of Foreign & Dom. Commerce)						
Chemicals and related prod. *d*..	$19,350	$14,658	$18,780	$12,552	$16,670	$11,958
Crude sulfur *d*	$1,517	$979	$419	$756	$849	$575
Coal-tar chemicals *d*	$1,995	$989	$2,539	$961	$2,421	$877
Industrial chemicals *d*	$41,175	$2,354	$4,467	$2,261	$4,727	$1,799
Imports						
Chemicals and related prod. *d*..	......	......	$6,681	$6,888	$5,422	$6,099
Coal-tar chemicals *d*	......	......	$1,113	$1,122	$419	$1,794
Industrial chemicals *d*	......	......	$1,108	$1,459	$1,136	$1,146
Employment (U. S. Dept. of Labor, 3 year av., 1923-25 = 100) Adjusted to 1937 Census Totals						
Chemicals and allied prod., including petroleum	123.2	116.6	122.6	116.0	121.0	113.4
Other than petroleum	123.7	116.4	122.9	115.7	121.1	112.4
Chemicals	135.1	117.0	135.6	118.6	135.2	118.1
Explosives	114.0	84.3	107.8	84.9	105.5	84.3
Payrolls (U. S. Dept. of Labor, 3 year av., 1923-25 = 100) Adjusted to 1937 Census Totals						
Chemicals and allied prod., including petroleum	133.5	119.5	132.5	120.6	131.3	118.9
Other than petroleum	132.4	116.7	131.5	117.3	130.2	114.8
Chemicals	159.5	130.2	159.3	133.3	158.2	132.0
Explosives	133.1	93.8	128.8	95.9	127.5	97.1
Price index chemicals*	85.0	84.6	85.1	84.8	81.0	79.4
Drugs & Pharmaceuticals* ...	81.8	77.4	81.4	77.7	78.1	76.3
Fert. mat.*	70.7	68.1	70.6	68.0	72.9	69.3
Paint and paint mat.	86.7	81.3	87.2	81.5	86.8	80.5
FERTILIZER:						
Exports (long tons, Nat. Fert. Association)						
Fertilizer and fert. materials ...	......	......	60,332	123.687	53,398	85,095
Ammonium sulfate	......	......	8,265	1,199	12,088	437
Total phosphate rock	......	......	31,691	90,738	16,708	62,068
Total potash fertilizers	......	......	637	17,102	475	2,132
Imports (long tons, Nat. Fert. Association)						
Fertilizer and fert. materials ...	......	......	181.636	142.430	147,975	110,847
Ammonium sulfate	......	......	6,920	14,179	7,889	6,746
Sodium nitrate	......	......	86,039	42,920	26,506	54,552
Total potash fertilizer	......	......	40,094	17,235	65,486	6,795

INDUSTRIAL TRENDS



Business: After a month of indecision business has finally taken the upward trend. Industrial activity has made sharp gains. Production indexes are definitely higher. Buying of steel, machinery and other industrial commodities has been accelerated. Retail sales have expanded. Price indexes in general have shown a downward trend.

Steel: The increase in business and industrial activity has been led by broad expansions in steel activity. Operations are now above 78% of capacity, which is a rapid jump from last month. Export business is coming in more rapidly than had been expected. With industrial buying programs and the assurance of a large defense program, it may be expected that the rate of production will progress toward full capacity output.

Electric Output: Improvement shown in power production at start of month has continued. The year to year increase over 1939 for the past month has been about 10.6% while for the previous month the increase was about 10.2%.

Retail Trade: Retail demand was well sustained last month despite repercussions that might have been expected following intensification of hostilities abroad. Stronger demand for consumer goods is developing throughout the country. The Federal Reserve Board estimates that department store sales were 5% greater than a year ago in the week ending May 18. Reports from 22,974 independent retail stores in 34 states showed gain of 3.3% during April, 1940, over April, 1939. The Department of Commerce reports that for the first quarter total retail sales were up 7% over like period in 1939.

Commodity Prices: Price declines have been general and well distributed over all commodities, with industrial as

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well as farm and food products moving downward. The Bureau of Labor Statistics Index of wholesale commodity prices declined to 77.8.

Automotive: The automotive industry continues its activity above expectations. Sales of new cars during May continued well ahead of last year. The total production of vehicles for April amounted to 432,746 in comparison with 423,620 for March. It is estimated that retail sales in April were about 30% over the previous April. If this estimate is correct it means that selling is very good and is keeping pace with production, which ran about 28% ahead of last year.

Curtailment of production, to prepare for changeover to 1941 models, is expected to get under way soon. Last year, curtailment began in July in most plants. The changeover period is being advanced by some makers to permit introduction of new models late in July or early in August.

Carloadings: Revenue freight loadings gained considerably during the past month. For the past four weeks loadings have averaged 15% above the same period of 1939, whereas the preceding month averaged about 10.75% ahead of 1939. During the week ending May 11 loadings amounted to 680,657, highest since mid-December level and 22.7% ahead of corresponding weeks last year.

Textiles: Activity in cotton and woolen mills declined somewhat further during the month. At silk mills activity remained at low level, while rayon production was maintained at a high rate.

Outlook: During the past month business and industrial activity has taken on new life. Unquestionably, a good share of the increased activity may be attributed to the increasing tempo of war. Close investigation of the effort that would be necessary to bring American national defense up to a proper level and to supply the growing needs from abroad is convincing many industrialists that sweeping changes will be brought about in business activity. The sharp rebound in steel operations shows a more rapid expansion of activity than had been thought possible. It seems likely that the rate will steadily progress toward capacity. Residential construction has been expanding and gives evidence of further advances. A marked increase in volume of new plant construction, equipment and armaments appears likely in the near future. This activity will undoubtedly influence other business and a general pickup should result.

MONTHLY STATISTICS (cont'd)

FERTILIZER: (Cont'd)	April 1940	April 1939	March 1940	March 1939	Feb. 1940	Feb. 1939
Superphosphate e (Nat. Fert. Association)						
Production, total	288,308	236,703	296,798	255,223	318,788	273,010
Shipments, total	853,623	807,405	594,321	607,094	269,588	259,568
Northern area	362,601	344,146	165,041	184,525	88,574	86,467
Southern area	491,022	463,259	429,280	422,569	181,014	173,101
Stocks, end of month, total	1,200,321	1,079,891	1,739,663	1,615,376	2,006,283	1,948,220
Tag Sales (short tons, Nat. Fert. Association)						
Total, 17 states	1,183,033	1,276,336	1,639,766	1,581,205	717,752	684,765
Total, 12 southern	1,125,397	1,232,279	1,538,065	1,478,041	676,256	628,996
Total, 5 midwest	57,636	44,057	101,701	103,164	41,496	55,769
Fertilizer employment *i*	174.5	176.6	151.8	145.7	109.3	77.2
Fertilizer payrolls *i*	136.2	135.7	112.7	104.4	83.7	98.2
Value imports, fert. and mat. *d*	$3,152	$4,370	$3,737	$3,291	$3,247	$2,417
GENERAL:						
Acceptances outst'd'g *f*	$223	$237	$229	$245	$233	$248
Coal prod., anthracite, tons	......	......	3,773,000	3,604,000	3,546,000	4,114,000
Coal prod., bituminous, tons	......	......	35,400,000	35,438,000	39,105,000	34,134,000
Com. paper outst'd'g *f*	$238	$191	$233	$191	$226	$195
Failures, Dun & Bradstreet	1,291	1,331	1,197	1,322	1,042	1,202
Factory payrolls *i*	96.4	85.5	98.2	87.6	97.8	86.0
Factory employment *i*	99.9	94.1	100.8	94.3	101.4	93.6
Merchandise imports *d*	$212,240	$186,296	$216,732	$190,416	$199,775	$158,035
Merchandise exports *d*	$324,008	$230,974	$352,272	$268,364	$338,639	$216,157
GENERAL MANUFACTURING:						
Automotive production	432,746	337,375	423,299	371,946	403,627	303,220
Boot and shoe prod., pairs	31,019,298	33,058,064	34,550,750	37,484,294	31,324,157	35,924,582
Bldg. contracts, Dodge *j*	$300,504	$330,030	$272,178	$300,661	$200,574	$220,197
Newsprint prod., U. S. tons	86,277	77,393	85,143	79,929	81,455	70,868
Newsprint prod., Canada, tons.	268,947	220,843	251,279	220,648	231,823	200,631
Glass containers, gross‡	4,584	4,071	4,606	4,128	4,128	3,389
Plate glass prod., sq. ft.	......	......	14,302,978	11,866,817	13,122,000	10,165,401
Window glass prod., boxes	1,023,465	738,951	1,107,437	912,301	1,099,049	808,585
Steel ingot prod., tons	......	......	4,236,050	3,814,013	4,374,625	3,347,288
% steel capacity	......	......	63	56.3	69.62	54.72
Pig iron prod., tons	3,137,019	2,302,918	3,270,499	2,681,969	3,311,480	2,307,409
U.S. cons'pt. crude rub., lg. tons	......	......	......	50,165	......	42,365
Tire shipments	......	......	4,351,657	4,564,794	4,118,030	3,731,263
Tire production	......	......	5,031,153	5,091,006	4,910,754	4,308,526
Tire inventories	......	......	10,836,239	9,962,917	10,156,918	9,474,660
Cotton consumpt., bales	623,893	543,187	626,331	649,940	662,659	562,580
Cotton spindles oper.	22,301,218	22,122,902	22,555,036	22,503,480	22,803,796	22,532,814
Silk deliveries, bales	......	......	21,685	37,863	22,485	33,219
Wool consumption *s*	......	......	26.7	30.9	31.4	31.1
Rayon deliv., lbs.	......	......	29,500,000	26,500,000	29,500,000	25,600,000
Hosiery (all kinds) *t*	......	......	8,641,929	10,586,102	8,975,925	9,047,217
Rayon employment *i*	305.6	302.4	309	303.8	313.3	305.9
Rayon payrolls *i*	310.9	278.6	316	286.9	321.3	287.8
Soap employment *i*	81.7	78.7	82.7	80.6	84.4	79.9
Soap payrolls *i*	99.0	94.9	99.5	96.2	100.3	94.9
Paper and pulp employment *i*	112.0	106.3	112.6	105.9	113.2	106.3
Paper and pulp payrolls *i*	115.4	104.7	115.1	105.6	117.3	105.2
Leather employment *i*	83.0	85.8	84.0	87.3	86.5	88.3
Leather payrolls *i*	78.7	81.4	80.4	85.2	83.6	87.3
Glass employment *i*	105.4	97.8	106.2	96.4	102.3	95.2
Glass payrolls *i*	114.3	93.8	112,8	100.0	108.3	97.9
Rubber prod. employment *i*	84.5	82.1	87.3	82.8	88.2	81.5
Rubber prod. payrolls *i*	85.8	81.0	88.4	83.2	88.3	81.0
Dyeing and fin. employment *i*	125.0	125.6	128.1	127.3	129.7	128.0
Dyeing and fin. payrolls *i*	104.7	106.3	108.7	110.7	108.1	111.9
MISCELLANEOUS:						
Oils & Fats Index (26=100)	......	......	59.9	55.3	61.8	54.7
Gasoline prod. *p*	......	......	51,230	58,367	47,596	43,409
Cottonseed oil consumpt., bbls.	......	......	......	307,053	......	217,781
PAINT, VARNISH, LACQUER, FILLERS:						
Sales 680 establishments	37,656,398	33,999,205	$31,592,093	$32,888,357	$26,537,573	$25,399,464
Trade sales (580 establishments)	20,188,957	18,862,040	$16,144,606	$17,656,995	$13,042,764	$13,145,314
Industrial sales, total	13,849,723	11,843,829	$12,639,821	$12,112,220	$11,146,277	$10,019,901
Paint & Varnish, employ. *i*	124.3	122.5	123.5	119.7	123.3	117.2
Paint & Varnish, payrolls *i*	131.8	125.6	130.5	122.7	129.3	117.9

a Bureau of Mines; *b* Crude and refined plus motor benzol, Bureau of Mines; *c* Based on 1 lb. of gun cotton to 7 lbs. of solvent, making an 8-lb. jelly; *d* 000 omitted, Bureau of Foreign & Domestic Commerce; *e* Expressed in equivalent tons of 16% A.P.A.; *f* 000,000 omitted at end of month; *i* U. S. Dept. of Labor, 3 year average, 1923-25 = 100, adjusted to 1937 census totals; *j* 000 omitted, 37 states; *p* Thousands of barrels, 42 gallons each; *q* 680 establishments, Bureau of the Census; *r* Classified sales, 580 establishments, Bureau of the Census; *s* 53 manufacturers, Bureau of the Census; *t* 387 identical manufacturers, Bureau of the Census, quantity expressed in dozen pairs; *v* In thousands of bbls., Bureau of the Census; ** Indices, Survey of Current Business, U. S. Dept. of Commerce; *z* Units are millions of lbs.; ‡ 000 omitted; * New series beginning March, 1940.

National Oil Products Earns $.88

Report of National Oil Products Co. for quarter ended March 31, 1940, shows net profit of $157,703 after depreciation, depletion, federal income taxes, etc., equal to 88 cents a share on 179,829 shares (par $4) of capital stock. This compares with $182,950 or $1.02 a share on 179,825 shares in March quarter of previous year.

Abbott Laboratories Nets $.96 a Share

Abbott Laboratories reports for quarter ended March 31, 1940, subject to year-end audit, net profit of $745,491 after charges and federal income taxes, equal after preferred dividend requirements, to 96 cents a share on 754,368 shares of common stock.

This compares with $617,835 or 88 cents a share on 672,566 shares of common stock for like 1939 quarter.

Net sales for quarter were $3,412,716 against $2,889,195 in March quarter of 1939.

For 12 months ended March 31, last, net profit was $2,119,150 equal after preferred dividend requirements, to $2.71 a share on common stock as compared with $1,770,831 or $2.50 a common share in 12 months ended March 31, 1939.

Net sales for 12 months ended March 31, last, were $12,008,829 against $10,196,365 in like period a year earlier.

Monsanto Earnings Up

Report of Monsanto Chemical Co. and American subsidiaries for quarter ended March 31, 1940, shows net income of $1,634,208 after depreciation, obsolescence, federal income taxes and minority interest in American subsidiary, equivalent after dividend requirements on $4.50 preferred stock, to $1.23 a share on 1,241,694 shares of common stock outstanding.

This compares with net income of American companies of $1,130,292 or 82 cents a share on 1,241,816 common shares in first quarter of 1939.

A dividend of $270,375 received in March, 1940, from Monsanto Chemicals Ltd., the British subsidiary, was not included in operating results for March quarter of this year, as it represented the final distribution of its earnings for the previous year.

Net income for first quarter of 1939, including British subsidiary, was reported as $1,209,425 or 88 cents a common share.

Dividends and Dates

Name	*Div.*	*Stock Record*	*Payable*
Atlas Powder Co.	75c	May 31	June 10
Duval Texas Sulphur	25c	May 20	May 31
Durez Plastics & Chemicals, Inc.			
6% pf., q.	37½c	May 20	June 1
7% pf., q.	$1.75	May 20	June 1
Eastman Kodak Co.			
q.	$1.50	June 5	July 1
Pf., q.	$1.50	June 5	July 9
Ferro Enamel Corp.	25c	June 10	June 25
Heyden Chemical Corp.	75c	May 24	June 1
International Nickel of Canada, payable in U. S. funds	50c	May 31	June 29
Merck & Co.	40c	June 20	July 1
Pf., q.	$1.50	June 20	July 1
National Gypsum Co. pf., q.	$1.12½c	May 17	June 1
New Jersey Zinc	50c	May 20	June 10
Norwich Pharmacal Co.	25c	May 24	June 10
Penn. Salt Mfg. Co.	$3.25	May 31	June 15
Texas Gulf Sulphur			
q.	50c	June 1	June 15
Extra	25c	June 1	June 15
United States Gypsum			
Co., q.	50c	June 15	July 1
Pf., q.	$1.75	June 15	July 1
United States Potash			
Co.	25c	June 15	June 29
6% pf., q.	$1.50	June 1	June 15

Earnings Statements Summarized

Company:	Annual dividends	Net income 1940	Net income 1939	Common share earnings 1940	Common share earnings 1939	Surplus after dividends 1940	Surplus after dividends 1939
American Commercial Alcohol:							
March 31 quarter	f $...	$76,345	$49,305	$.19	$.09	......	......
Celanese Corp. of America:							
March 31 quarter	y(z)1.00	2,419,414	1,336,714	h1.64	h.71	......	......
Twelve months, Mar. 31	y(z)1.00	7,456,801	3,702,215	h4.48	h1.36	......	......
Columbian Carbon Co.:							
March 31 quarter	y 4.50	1,018,639	829,878	1.90	1.54	$481,233	$292,472
Commercial Alcohols, Ltd.:							
Year, March 31	....	97,429	73,091	h.41	h.30	......	......
General Printing Ink Corp.:							
March 31 quarter	y .80	190,144	225,940	.19	.23	......	......
Glidden Co.:							
Six months, April 30	y .80	614,933	366,147	h.47	h.17	......	......
Twelve months, April 30	y .80	2,102,335	559,173	h2.00	h.13	......	......
Koppers Co.:							
Twelve months, Mar. 31	....	2,239,001	1,078,745	p11.19	p5.39	......	......
New Jersey Zinc Co.:							
March 31 quarter	y 3.00	1,765,112	1,076,266	.90	.55	......	......
Sharp & Dohme, Inc.:							
March 31 quarter	f ...	303,687	182,026	.13	p.79	......	......
Twelve months, Mar. 31	f ...	1,023,931	*.....	.29	....	......	......
Vick Chemical Co.:							
March 31 quarter	y 3.00	595,655	787,615	h.86	h1.12	......	......
Nine months, Mar. 31	y 3.00	2,546,685	2,709,524	h3.66	h3.87	......	......
West Virginia Pulp & Paper Co.:							
Six months, April 30	y .30	1,366,844	563,011	.99	.10	......	......

a On first preferred stock; *b* On second preferred stock; *c* On combined Class A and Class B shares; *d* Deficit; *f* No common dividend. *j* On average number of shares; *k* For the year 1939; *p* On preferred stock; *y* Amount paid or payable in 12 months to and including the payable date of the most recent dividend announcement; ‡ Indicated quarterly earnings as shown by comparison of company's reports for the 6 and 9 months periods; § Plus extras; *n* Preliminary statement; *h* On shares outstanding at close of respective periods; ** Indicated quarterly earnings as shown by comparison of company's reports for 1st quarter of fiscal year and the six months period. ‡‡ Indicated earnings as compiled from quarterly reports. †Net loss.

Price Trend of Representative Chemical Company Stocks

	May 4	May 11	May 18	May 25	Net gain or loss last mo.	Price on May 27 1939	1940 High	1940 Low
Air Reduction Co.	46⅞	45	41⅛	38⅞	— 8	53	58⅛	36¾
Allied Chemical & Dye	179	177¾	155	140½	—38½	166½	182	136
Amer. Agric. Chem.	17½	17	14½	13	— 4½	23⅜	21	12⅛
Amer. Cyanamid "B"	37	37⅞	31½	29⅞	— 7⅛	18	39⅞	31½
Columbian Carbon	95	92	79	74	—21	90	98¾	71
Commercial Solvents	14½	13½	9⅛	8¾	— 5¾	11	16⅝	8
Dow Chemical Co.	167	170	155	139½	—27½	114½	171	137
Du Pont	187	186	159½	153	—34	146⅛	189¼	146½
Hercules Powder	98⅞	98	88¼	79⅞	—19	69	100½	76¼
Mathieson Alkali	29⅞	30	23½	23	— 6⅞	26	32¾	21½
Monsanto Chem. Co.	117¼	113¼	95	90½	—26¾	98½	119	89¼
Standard Oil of N. J.	42¾	42¾	35½	32½	—10¼	44¾	46½	30
Texas Gulf Sulphur	35	34¼	29¼	29	— 6	29¼	35¾	26⅞
Union Carbide & Carbon	81¾	81	68½	64	—17¾	75	88⅜	61
U. S. Industrial Alcohol	26⅝	24¾	17¼	16½	—10⅛	16½	28	14

United Carbon Earnings Up Slightly

Report of United Carbon Co. and subsidiaries for quarter ended March 31, 1940, shows net profit of $495,184 after federal and state taxes, depreciation, depletion, minority interest, etc., equal to $1.24 a share on 397,885 no-par shares of common stock.

This compares with $459,202 or $1.15 a share reported by company, in March quarter of previous year.

West Virginia Pulp & Paper Earnings Increase

Report of West Virginia Pulp & Paper Co. and subsidiaries for six months ended April 30, 1940, subject to audit and year-end adjustments, shows net profit of $1,366,844 after depreciation, depletion, interest, amortization, federal income taxes, etc., equal after dividend requirements on 6% cumulative preferred stock, to 99 cents a share on 902,432 shares of common stock.

This compares with $563,011 or ten cents a common share for the six months ended April 30, 1939, representing a major increase in the company's earnings over last year.

Chemical Finances

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Chemical Stocks and Bonds

May 1940 Last	May 1940 High	May 1940 Low	1939 High	1939 Low	1938 High	1938 Low	Sales: Number of shares May 1940	Sales: 1940	Stocks	Par $	Shares Listed	Dividends*	Earnings** $-per-share-$ 1939	1938	1937
NEW YORK STOCK EXCHANGE															
53½	70¼	50	71½	53	61	46¼	8,500	22,400	Abbott Labs.	No	752,468	$2.05	2.61	2.43	2.51
39	58⅛	36¾	68	45¼	67⅞	40	49,600	160,300	Air Reduction	No	2,563,992	1.50	1.98	1.47	2.86
141	182	136	200½	151½	197	124	19,100	59,200	Allied Chem & Dye	No	2,214,099	9.00	9.50	5.92	11.19
13½	21	12⅛	24½	16	28⅛	22	8,000	20,600	Amer. Agric. Chem	No	627,987	1.30	1.22	2.23	2.95
5	8¼	4⅛	11⅞	5½	15	9	16,000	39,900	Amer. Com. Alcohol	No	280,934	....	.38	—2.05	3.23
24	35½	24	37	21	31½	20	3,500	10,300	Archer-Dan.-Midland	No	545,416	1.10	3.02	.43	5.03
57	80½	57	71	50	68	36	4,600	13,200	Atlas Powder Co.	No	250,288	3.00	3.82	2.69	4.40
115	124¾	115	127	116	126¼	105	760	2,240	5% conv. cum. pfd.	100	68,597	5.00	18.94	14.77	20.90
23¼	35½	20	30¼	13⅝	26⅝	9	138,000	469,800	Celanese Corp. Amer.	No	1,000,000	.50	3.53	.26	2.04
110	119	105½	109⅞	84	96	82	5,550	20,100	prior pfd	100	164,818	7.00	37.72	15.05	27.07
10⅞	20	10⅛	18	11½	17	7⅛	64,900	300,100	Colgate-Palm.-Peet	No	1,962,087	1.00	2.74	1.77	—.35
73	98¾	71	96	73	98½	53¾	4,400	14,700	Columbian Carbon	No	537,406	4.50	5.32	5.13	8.31
9	16⅝	8	16	8⅝	12¼	5⅞	146,900	599,300	Commercial Solvents	No	2,636,878	....	.61	—.11	.60
45⅝	65⅛	44½	67½	54⅞	70¾	53	33,900	98,100	Corn Products	25	2,530,000	3.00	3.32	3.18	2.52
165	179	165	177	150	177	162	900	3,300	7% cum. pfd.	100	245,738	7.00	41.18	39.69	32.96
13	23¼	12½	32⅝	18	40⅞	25	4,420	13,640	Devoe & Rayn. A.	No	95,000	....	2.05	—1.72	4.05
140	171	137	144⅝	101½	141	87⅞	13,200	45,300	Dow Chemical	No	1,034,988	3.00	3.76	3.91	4.15
156¼	189¼	146½	188½	126¼	154¾	90½	67,000	187,300	DuPont de Nemours	20	11,065,762	7.00	7.70	3.74	7.37
120⅜	126	114	124⅛	112	120½	109½	5,200	31,750	4½% pfd.	No	1,688,850	4.50	52.25	87.27	165.48
128	166¾	125	186⅛	138⅛	187	121½	26,500	81,900	Eastman Kodak	No	2,476,013	6.00	8.55	7.54	9.76
160	178	159	183½	155½	173	157	290	990	6% cum.	100	61,657	6.00	349.31	281.23	362.45
26⅝	38¾	24¾	36	18¼	32	19⅞	33,400	116,100	Freeport Texas	10	796,380	1.50	....	1.87	3.30
7	10	5½	10⅞	7	12⅛	6¾	9,700	26,800	Gen. Printing Ink	1	735,960	.80	.94	.62	1.32
12	19¾	11	24½	14	28½	13	25,100	66,700	Glidden Co.	No	829,989	.50	1.70	—.29	2.62
34	44⅝	30	47	34	51½	37	600	5,200	4½% cum. pfd.	50	199,940	2.25	4.27	1.03	12.72
90	113¼	90	112¼	93	111	76¾	3,400	9,000	Hazel Atlas	25	434,409	5.00	6.64	4.97	6.67
80⅛	100½	76¼	101½	63	87	42¾	15,800	54,800	Hercules Powder	No	1,316,710	2.85	3.65	1.96	2.97
128	133½	128	135⅛	128½	135¼	126¾	650	3,310	6% cum. pfd.	100	96,194	6.00	60.87	35.31	50.75
18¾	29	16⅜	29½	16¾	30⅝	14⅝	19,900	50,500	Industrial Rayon	No	759,325	.75	1.77	.34	.34
25½	47⅜	24	46¼	17½	34½	15	15,000	45,100	Interchem.	No	290,320	.40	4.10	.33	1.44
95	113	94½	109½	90	98	80	1,040	4,050	6% pfd.	100	65,661	6.00	24.27	7.39	12.26
1½	2⅜	1	3⅝	1½	3⅞	2	10,300	39,600	Intern. Agricul.	No	436,048	....	1.32	.003	.16
18¼	38	18⅛	41	16	29	15	3,300	11,200	7% cum. pfd.	100	100,000	....	1.26	7.01	7.70
20⅞	38⅞	20	55¾	35	57⅝	36⅞	111,600	457,300	Intern. Nickel	No	14,584,025	2.00	2.39	2.09	3.31
26⅞	37⅛	26⅞	38	29	30¼	19½	1,300	6,600	Intern. Salt	No	240,000	1.75	1.92	2.29	2.11
16	23¾	14⅜	22½	14½	24	19⅛	1,900	8,100	Kellogg (Spencer)	No	509,213	1.10	1.39	.71	2.81
32¾	53⅜	32¼	56¾	36½	58⅝	23¼	33,900	97,200	Libbey Owens Ford	No	2,513,258	2.75	3.21	1.57	4.19
12	18⅜	10⅛	19	13½	21½	12⅛	17,300	61,400	Liquid Carbonic	No	700,000	1.00	1.62	1.81	2.37
23¾	32¼	21½	37⅜	20¾	36⅞	19¾	19,000	62,100	Mathieson Alkali	No	828,171	1.50	1.12	1.01	1.81
89⅞	119	89¼	114¾	85¾	110	67	19,000	75,800	Monsanto Chem.	No	1,241,816	3.00	4.01	2.35	4.40
112	118	110	121	110	117½	111	750	1,680	4½% pfd. A.	No	50,000	4.50	54.29	31.51	49.99
115⅝	121½	113½	122½	112	...	...	500	1,320	4½% pfd. B.	No	50,000	4.50	54.29	31.51	49.99
16	22½	14⅛	27½	17⅞	31	17⅛	59,200	163,600	National Lead	10	3,095,100	.87	1.28	.75	.96
160	173⅜	160	173⅛	152	178½	154	600	3,500	7% cum. "A" pfd.	100	213,793	7.00	27.04	20.03	22.86
137½	148½	137½	145	132	145½	127	600	1,850	6% cum. "B" pfd.	100	103,277	6.00	55.30	35.97	43.77
7	14¼	6⅛	17¾	8½	19½	9⅞	56,300	126,400	Newport Industries	1	620,459	....	.66	—.08	2.22
45	64⅝	43½	70	50	76¼	40	26,200	84,700	Owens-Illinois Glass	12.50	2,661,204	2.00	3.17	2.02	3.51
55¼	71¾	53¼	66	50⅝	59	39½	35,900	109,600	Procter & Gamble	No	6,325,087	2.25	3.80	2.59	4.03
113⅛	118½	112½	119¾	112	122¼	114	720	5,340	5% pfd.	100	169,517	5.00	298.55	101.81	157.05
8⅛	13⅛	8	17¼	9⅞	18⅜	10	24,100	113,300	Shell Union Oil	No	13,070,625	.50	.77	.70	1.44
96	108¼	96	107⅞	98½	106½	93	2,300	7,500	5½ cum. pfd.	100	341,000	5.50	34.61	33.18	60.59
13¾	23¼	13	29½	15½	34¾	18½	16,600	33,300	Skelly Oil	No	995,349	.75	1.99	2.27	6.07
21¼	29	20¾	30	22¾	35½	24¾	107,000	296,200	S. O. Indiana	25	15,272,020	1.25	2.24	1.82	3.16
30	46½	30	53½	38	58⅝	39¾	172,900	509,800	S. O. New Jersey	25	26,618,065	1.25	3.27	2.86	5.64
4½	7	4¼	9⅛	4	8	3⅞	26,800	61,100	Tenn. Corp.	5	853,696	....	.41	.46	1.09
35¾	47⅝	33	50¾	32½	49⅝	37⅝	139,600	387,700	Texas Corp.	25	10,876,882	2.00	3.02	2.13	5.02
29½	35¾	26⅞	38⅛	26	38	26	33,400	97,800	Texas Gulf Sulphur	No	3,840,000	2.00	2.04	1.81	3.03
64	88¾	61	94¼	65½	90⅞	57	92,800	233,200	Union Carbide & Carbon	No	9,277,288	1.90	3.86	2.77	4.81
43	65⅝	42½	69½	52	73½	39	4,300	20,200	United Carbon	No	397,885	3.00	3.81	3.78	5.91
16	28	14	29⅝	13½	30¼	13½	26,500	79,900	U. S. Indus. Alcohol	No	391,238	....	.20	—1.08	1.24
30¾	43⅞	25	40	16	28⅞	11½	183,900	304,200	Vanadium Corp. Amer.	No	377,140	1.00	3.25	.61	2.22
19	31½	19	29¾	18¼	25¼	13½	4,100	18,700	Victor Chem.	5	696,000	1.40	1.59	1.05	1.01
2⅛	4⅛	1¾	5¾	2½	5⅝	2¾	17,900	39,800	Virginia-Caro. Chem.	No	486,122	....	1.57	—1.80	—.05
16	31¾	14	33¾	17	32⅛	15¾	9,800	26,500	6% cum. part. pfd.	100	213,052	....	2.41	1.90	5.88
30	38½	27¾	39¼	15¼	20⅛	10	9,600	32,700	Westvaco Chlorine	No	339,362	1.85	2.81	1.32	1.46
32½	39¼	28⅞	39½	29	31½	20	5,300	15,400	cum. pfd.	30	192,000	1.50	6.64	4.19	4.09
NEW YORK STOCK EXCHANGE															
30⅝	39⅞	26	35¾	18⅜	30¼	15½	103,300	325,700	Amer. Cyanamid "B"	10	2,618,387	.60	2.07	.91	2.09
105½	127	98	112¾	76	92	50	4,025	14,600	Celanese, 7% cum. 1st pfd.	100	148,179	7.19	34.17	8.95	22.32
3	5⅞	3	6¾	3	6¾	3	300	7,000	Celluloid Corp.	15	194,952	....	....	—2.73	—.92
7	7¾	7	7⅝	4½	12	6½	....	700	Courtauld's Ltd.	£1	24,000,000	.13	4.92%	.26%	8.64%
5½	8⅛	5¼	9¼	5	9⅞	6	3,300	12,700	Duval Texas Sulphur	No	500,000	....	1.25	.71	.43
62½	92	60	68	30	41¼	27	1,575	13,725	Heyden Chem. Corp.	100	125,497	2.00	5.98	2.07	3.94
78½	104	75	117	90	115½	55	12,300	31,900	Pittsburgh Plate Glass	25	2,192,824	4.00	4.94	3.00	8.53
67¼	100	65	113½	81	117¾	66	7,500	26,900	Sherwin Williams	25	638,927	2.75	5.96	2.43	8.76
107½	114¾	106	116	106½	114⅛	107	780	1,680	5% cum. pfd.	50	132,189	5.00	35.08	8.76	45.50
PHILADELPHIA STOCK EXCHANGE															
158¾	185	158¾	179	135	167	121½	575	2,325	Pennsylvania Salt	50	150,000	6.00	10.52	6.29	11.79

May 1940 Last	May 1940 High	May 1940 Low	1939 High	1939 Low	1938 High	1938 Low	Sales May 1940	Sales 1940	Bonds	Date Due	Int. %	Int. Period	Outstanding $
NEW YORK STOCK EXCHANGE													
101⅞	105¼	100⅛	103¾	98	105⅝	99⅛	182,000	795,000	Amer. I. G. Chem. Conv.	1949	5½	M-N	$22,400,000
28	41	28	41½	19	38	25⅛	218,000	699,000	Anglo Chilean Nitrate inc. deb.	1967	4½	J	10,400,000
106⅞	107½	105½	108⅜	101¾	106⅛	102⅜	24,000	187,000	Dow Chemical	1951	3	J-D	5,000,000
100	106	100	102½	90	94	93	122,000	805,000	Industrial Rayon	1948	4½	J-J	7,100,000
28	39¾	28	37	21⅛	35⅝	24¾	91,000	924,000	Lautaro Nitrate inc. deb.	1975	4	J-D	27,200,000
21	21	21	30	16	35⅝	24¾	......	5,000	Ruhr Chem.	1948	6	A-O	1,500,000
94½	97¾	93½	95¾	88¾	...	...	978,000	3,792,000	Shell Union Oil	1954	2½	J-J	85,000,000
101⅝	106⅜	101⅛	106¼	97⅜	105⅝	100	332,000	1,273,000	Standard Oil Co. (New Jersey) deb.	1961	3	J-D	85,000,000
101⅛	106⅝	100⅝	106½	94¼	103	98	367,000	1,322,000	Standard Oil Co. (New Jersey) deb.	1953	2¾	J-J	50,000,000
103⅜	108	103¼	108⅝	102	103	95	337,000	1,313,000	Texas Corp.	1951	3½	J-J	60,000,000
103⅝	106¾	102	105⅞	95¼	...	...	505,000	1,685,000	Texas Corp.	1959	3	A-O	40,000,000

* Paid in 1939, including extras but excluding dividends paid in stock. ** For either fiscal or calendar year.

Fats and Oils, 1939

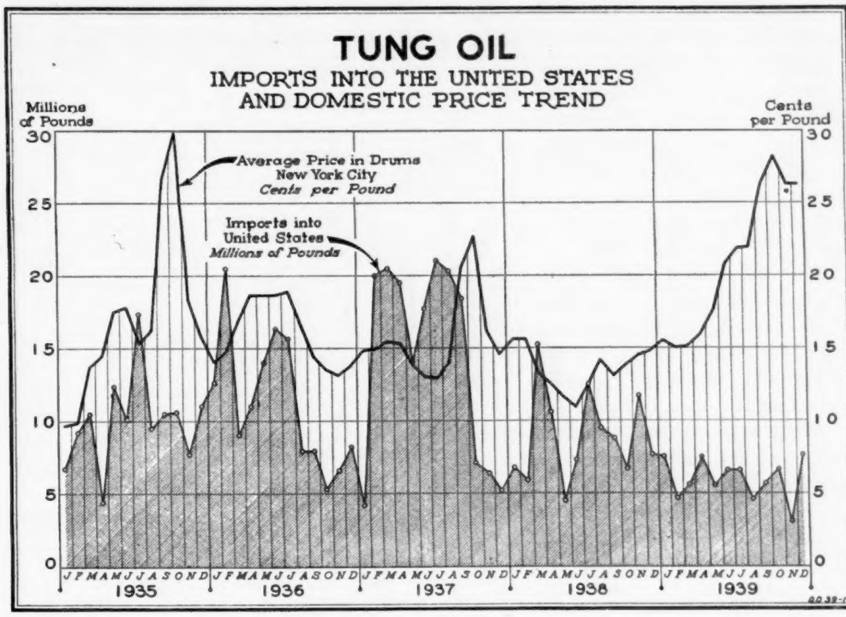
Continued from last month

Production

The 1939 production of *linseed oil* from both domestic and imported flaxseed, amounted to 565 million pounds, an increase of 28 per cent. over the 441 million pounds produced in 1938 and 18 per cent. more than the 480 million pound average in the 5 years 1933-1937, the latter including the heavy 1937 output of 665 million pounds.

Crude peanut oil production in 1939 was 72 million pounds, an 8 per cent. decrease from the 78 million pounds produced in 1938, but 60 per cent. over the 1933-37 average of 45 million pounds.

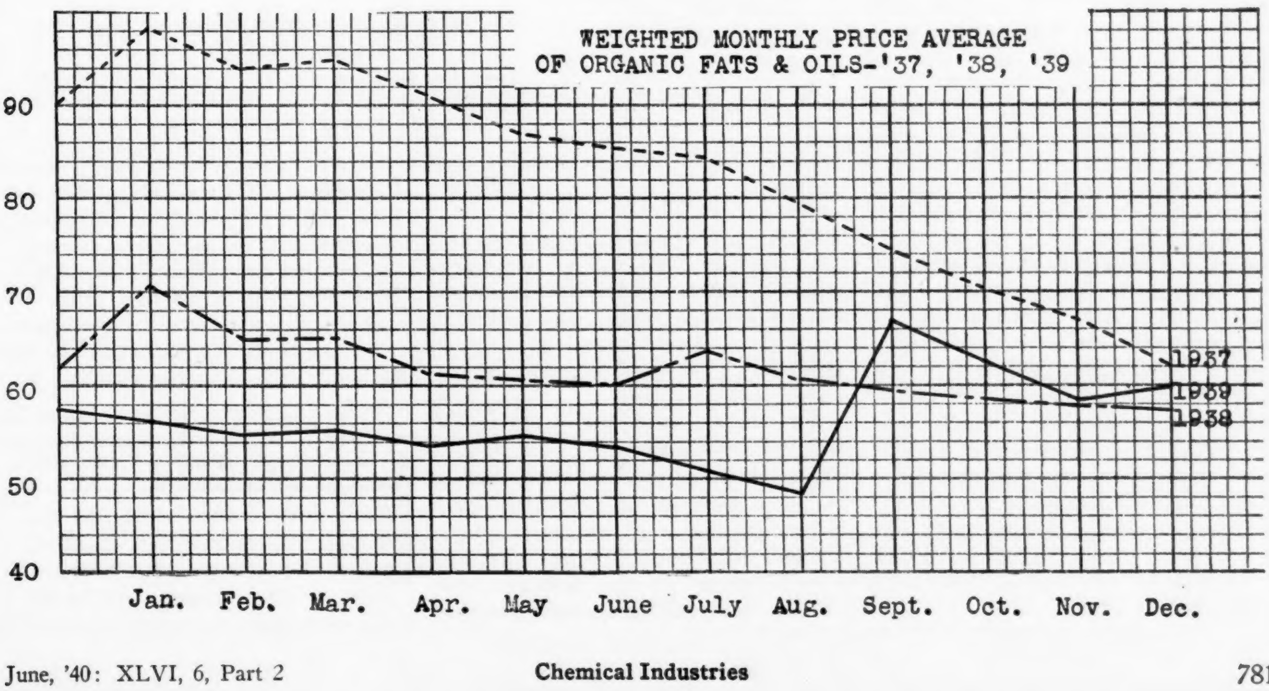
Domestic production of *fish oils* (other than cod and cod liver oil, which amount to only 1 to 2 million pounds yearly) amounted to 208 million pounds, an 11 per cent. increase over the 188 million



AVERAGE MONTHLY PRICE INDEX OF ORGANIC FATS AND OILS FOR 1939

(Base period 1926)

Grease	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Lard	63.9	61.7	63.9	62.2	62.2	60.9	55.0	51.9	80.1	74.6	70.2	66.4
Castor oil	48.2	48.3	46.8	44.4	45.5	43.0	40.6	40.2	55.0	47.6	44.5	46.6
China wood oil	73.3	73.3	69.8	64.7	64.7	64.7	64.7	64.7	71.1	86.2	89.7	98.1
Coconut oil	113.4	110.0	111.2	117.6	130.0	147.1	158.9	158.9	188.2	198.6	181.5	187.2
Cod oil	32.4	31.7	33.2	32.4	34.2	33.1	31.1	29.5	44.3	41.3	38.1	37.6
Corn oil	46.8	48.4	49.2	52.4	52.4	52.4	52.4	52.7	...	...	116.1	116.1
Linseed oil	64.1	61.4	60.9	61.9	61.4	60.4	55.2	51.8	70.3	67.5	58.3	59.9
Menhaden oil	77.3	77.8	80.4	80.7	81.6	84.1	81.6	78.4	95.2	93.2	88.7	94.2
Oleo oil	66.9	63.2	62.9	66.9	66.9	56.9	54.4	48.9	62.7	72.9	70.1	67.1
Olive oil	65.1	61.6	65.1	63.1	63.1	63.1	63.1	60.3	84.8	85.3	72.6	63.1
Olive oil foots	75.1	72.0	69.3	67.7	67.5	66.8	66.1	66.0	104.1	112.2	87.3	80.1
Palm oil	82.9	81.8	80.9	80.7	81.4	81.2	79.7	80.2	108.2	115.3	105.0	98.0
Palm kernel oil	38.3	38.3	38.3	37.6	36.9	36.3	35.0	33.0	...	...	47.8	42.9
Peanut oil	38.3	38.3	38.9	38.7	38.9	41.0	39.8	38.7	...	...	59.8	50.7
Rapeseed oil	53.0	49.3	50.7	47.6	48.2	46.6	45.7	41.8	56.8	57.3	55.5	55.5
Sardine oil	95.2	95.2	95.2	95.2	95.2	95.2	95.2	95.8	102.8	118.7	117.4	117.4
Sesame oil	59.5	59.8	63.3	67.9	66.4	65.0	53.2	47.7	68.7	70.6	64.3	65.6
Soybean oil	76.5	69.0	66.5	66.5	66.9	66.9	66.9	66.9	78.3	...	...	87.4
Whale oil	50.4	49.0	49.0	49.0	49.0	48.4	48.8	41.1	57.9	60.7	50.8	53.5
Stearin, oleo	75.0	75.0	75.0	75.0	75.0	75.0	73.1	69.2	88.5	87.5	87.5	87.5
Tallow	55.7	52.3	54.6	50.4	48.4	48.6	46.3	46.9	82.6	72.6	63.2	55.6
Cottonseed oil	63.3	60.7	62.5	61.1	62.5	60.7	55.1	51.5	76.7	70.7	67.6	65.5
Weighted average	61.7	57.4	59.0	56.3	56.0	55.5	52.1	46.2	64.2	59.9	56.0	60.5
	56.2	54.7	55.3	53.8	54.5	53.7	50.8	48.1	67.0	62.5	58.4	59.9



Fats & Oils, 1939—p. 11

pounds produced in 1938. The 1933-37 yearly average was also 208 million pounds.

Whale oil (including sperm oil) reported as domestic production in 1939 totalled 26 million pounds, compared with 58 million pounds in 1938, 69 million pounds in 1937, 31 million pounds in 1936, and a 9 million pound annual average in the fifteen years 1921-1935.

The Bureau of the Census reports stocks of whale oil on December 31, 1939 of 45 million pounds, compared with 82 million pounds in 1938, 91 million pounds in 1937, and 39 million pounds on December 31, 1936.

Whale and sperm oil imports were 20 million pounds in 1939, compared with 22 million pounds in 1938, 55 million pounds in 1937, and a 33 million pound average in the preceding five years. Whale oil, in the past year, found a much more attractive market in Europe than in the United States.

Imports

Heavy European buying of Philippine *copra* for several months prior to the outbreak of war and a temporary lack of shipping space for copra and coconut oil to the United States in September and October were factors in our reduced imports of these products last year. Other influences were relatively large supplies of domestic fats and oils and increased imports of the competing Brazilian *babassu kernels*, arrivals of which were more than twice those of 1938, the previous peak year of babassu imports.

Imports of *palm oil* were larger than in 1938, and one result of the European war is a diversion of these shipments from the Netherlands Indies to the United States, instead of to the Netherlands. The mother country was the principal European destination of Sumatra palm oil shipments in normal times, a good portion of which was transshipped on Rhine River barges to Germany. Now with palm oil, as a vegetable oil, on the conditional contraband list, the one open market appears to be the United States. Exports of palm oil from the Netherlands Indies to the United States in October of 35 million pounds were the largest to this country for any month on record.

With all the main transportation routes in China blockaded, imports of *tung oil* were the lightest in 18 years, creating a favorable market in the United States for increased imports of Brazilian *oiticica oil*, Manchurian *perilla oil*, and Brazilian *castor beans*. Experiments during the past year have resulted in producing dehydrated castor oil that could, to some extent, replace tung oil in the drying oils industries. The commercial production of castor beans was recently undertaken in Florida and Texas.

PRODUCTION, CONSUMPTION AND STOCKS OF FATS AND OILS

KIND	Factory operations for the quarter ending Mar. 31, 1940: Production (pounds)	Consumption (pounds)	Factory and Warehouse stocks Mar. 31, 1940 (pounds)
Vegetable Oils (1)			
Cottonseed, crude	403,184,874	403,823,867	186,124,479
Cottonseed, refined	380,268,624	278,034,433	643,947,051
Peanut, virgin and crude (2)	9,424,000	6,707,659	5,451,471
Peanut, refined	6,094,008	7,946,829	10,807,261
Coconut, crude	98,519,404	149,760,612	196,939,502
Coconut, refined	70,920,434	55,986,136	13,407,085
Corn, crude	41,025,373	46,366,073	14,654,588
Corn, refined	42,462,487	23,673,005	13,757,115
Soybean, crude	155,468,263	126.307,551	54,305,010
Soybean, refined	112,866,318	90,336,587	43,980,670
Olive, edible	1,196,678	700,329	8,445,659
Olive, inedible	———	1,820,746	3,199,589
Sulfur oil or olive foots	———	4,413,964	13,173,674
Palm-kernel, crude	(3)	1,030,596	360,373
Palm-kernel, refined	777,914	827.563	629,377
Palm, crude	———	32,329,725	123,150,557
Palm, refined	4,107,944	7,985,348	10,160,860
Babassu, crude	16,815,659	15,459,111	6,282,968
Babassu, refined	5,167,542	4,279,040	732,891
Rapeseed	———	2,199,699	6,683,284
Linseed	150,196,817	85,526,016	172,799,536
Chinese wood or tung	(3)	14,760,580	45,936,363
Perilla	(3)	8,903,645	8,207,815
Castor	28,527,538	12,653,668	16,707,398
Sesame	(3)	359,984	1,083,360
All other	5,352,061	7,555,130	13,528,484
Fish Oils (1)			
Cod and cod-liver	342,696	4,340,230	23,682,048
Other fish oils (4)	14,416,059	47,326,102	127,511,534
Marine animal oils	19,256,167	11,462,767	52,327,752
Animal Fats:			
Lard, neutral	1,466,411	604,139	807,220
Lard, other edible	481,794,985	5,996,852	273,078,619
Tallow, edible	21,525,842	9,679,045	8,268,875
Tallow, inedible	182,619,349	211,900,643	276,697,428
Neat's-foot oil	1,020,048	1,328,079	1,685,069
Greases:			
White	29,504,625	24,285,989	38,835,685
Yellow	27,793,450	34,022.731	36,855,741
Brown	18,503,758	12,986,812	14,404,825
Bone	6,059,273	542,894	1,093,525
Tankage	12,358,919	1,215,007	3,285,165
Garbage or house	12,152,560	6,179,145	6,352,025
Wool	1,721,411	1,760,638	4,579,306
All other	4,108,566	4,461,210	5,444,371
Other Products:			
Shortening	273,118,840	1,561,014	57,249,824
Hydrogenated oils	213,511,243	201,637,514	30,952,844
Stearin, vegetable	16,855,076	17,495,403	6,562,713
Stearin, animal, edible	8,055,768	6,268,799	4,671,999
Stearin, animal, inedible	4,618,798	3,332,760	3,448,234
Oleo oil	15,324,842	3,998,808	5,056,740
Lard oil	7,096,197	2,695,202	4,231,357
Tallow oil	2,057,076	1,350,081	1,618,075
Fatty acids	29,130,833	22,215,906	12,006,580
Fatty acids, distilled	9,833,452	4,211,710	4,337,871
Red oil	12,512,338	8,093,796	7,788,476
Stearic acid	10,139,152	4,015,018	4,808,820
Glycerin, crude 80% basis	50,918,256	50,533,855	17,317,317
Glycerin, dynamite	20,589,904	8,913,643	27,780,856
Glycerin, chemically pure	18,478,011	7,750,841	32,121,914
Cottonseed foots, 50% basis	39,964,372	35,343,080	18,605,580
Cottonseed foots, distilled	6,238,160	5,778,279	2,838,364
Other vegetable oil foots, 50% basis	23,541,808	15,931,055	3,733,371
Other vegetable oil foots, distilled	301,224	241,186	525,187
Acidulated soap stock	13,189,720	15,204,528	34,066,939
Miscellaneous soap stock	363,631	347,812	570,891

(1) Bureau of Fisheries collected the data from fish oil producers and canners.
(2) Bureau of Agricultural Economics collected the data from peanut oil producers.
(3) Included in "All other" vegetable oils.
(4) Includes 12,956,101 herring and sardine, and 324,272 menhaden.

Prices

With relatively heavy stocks of fats and oils, entering 1939 and an increasing domestic lard production, prices, excepting for the drying oils, were generally lower in the first 7 months of the year than in 1938, declining in August to the lowest point in 5 years.

Following the outbreak of the European war, prices in early September advanced sharply, reflecting speculative anticipation of future increases in foreign demand, higher war-risk insurance for imported fats, oils and oilseeds, and generally improved domestic business conditions. As it became increasingly apparent that the European war has resulted in lower shipments of lard to Europe than would otherwise have been the case, the domestic fats and oils market declined at the end of September, since which time prices had a generally lower trend for the balance of 1939, although still well above the low levels of the mid-summer months.

From Fats & Oils Trade of the U. S. in 1939 by Charles E. Lund, Bureau of Foreign & Domestic Commerce.

For comparable statistics for earlier years refer to Statistical & Technical Data Section, July, '39, pages 109-112.

U. S. Chemical Patents

Off. Gaz.—Vol. 513, Nos. 4, 5—Vol. 514, Nos. 1, 2—p. 191

A Complete Check—List of Products, Chemicals, Process Industries

Cellulose

Solution of nitrocellulose including a substance selected from group consisting of dimethyl cyanamide and diethyl cyanamide. No. 2,198,173. Leonard P. Moore and Richard O. Roblin, Jr., to American Cyanamid Company.

Manufacture of compressed cellulosic or wood products. No. 2,198,269. Harry K. Linzell and Joseph W. Gill to United States Gypsum Co.

Method purifying sulfite wood cellulose. No. 2,198,706. Lyle M. Sheldon and Lionel E. Goff and Dwight A. Alderson and George N. Fisher to The Cellulose Research Corporation.

Method moistureproofing regenerated cellulose. No. 2,198,886. Charles F. Silsby to The Solvay Process Company.

Flexible, durable pellicle consisting of regenerated cellulose. No. 2,199,927. William Frederick Underwood to E. I. du Pont de Nemours & Co.

Method and apparatus for digesting cellulosic materials. No. 2,200,034. Albert D. Merrill.

Packing material made of wood pulp cellulose. No. 2,200,171. William A. Hermanson.

Chemical Specialty

Non corrosive antifreeze liquid comprising an alcohol and organic inhibitor. No. 2,197,774. Fred R. Whaley and Headlee Lamprey to Carbide and Carbon Chemicals Corp.

A flour conditioner suitable for addition to untreated flours in making bakery products. No. 2,197,784. Hans F. Bauer and Bruce W. Thayer to Stein Hall Mfg. Co.

Dialyzing diaphragms and process of making same. No. 2,197,805. Louis E. Lovett.

Photographic process and emulsion utilizing cation-active surface active agents. No. 2,197,809. David M. McQueen to Du Pont Film Mfg. Corp.

Process of electrostatic separation in manufacturing cement. No. 2,197,864. Herbert B. Johnson to Ritter Prods. Corp.

Sweeping composition consisting of fragmented cottonseed hull with hirsute surfaces and a wetting liquid that at atmospheric temperatures is substantially non-volatile and inert to the fragmented hull. No. 2,198,013.

Preparation peroxidation products of fatty material having dough bleaching properties. No. 2,198,015. Herbert Otto Renner and Louis W. Haas to J. R. Short Milling Co.

In preparation lithographic plates step of wiping coat of varnish with solution whereby varnish coating is made so thin, it becomes penetrable by water. No. 2,198,017. Alfred Schlisinger.

Health food product, being a calcium containing nonacidatic preparation. No. 2,198,165. Lodewijk Hamburger.

Process for the reactivation of catalysts used in the dehydrogenation of organic compounds. No. 2,198,195. Herbert P. A. Groll and James Burgin to Shell Development Co.

Modified antioxygenic starch and method of making and using the same. No. 2,198,197. Sidney Musher to Musher Foundation, Inc.

Modified antioxygenic milk solids and method of making and using the same. No. 2,198,198. Sidney Musher to Musher Foundation, Inc.

Stabilizing food composition. Nos. 2,198,199-205. Sidney Musher to Musher Foundation, Inc.

Methods improving quality and stabilized roasted coffee. Nos. 2,198,206-207. Sidney Musher to Musher Foundation, Inc.

Method stabilizing refined cottonseed oil against oxidative deterioration. No. 2,198,208. Sidney Musher to Musher Foundation, Inc.

Process stabilizing meat against oxidative deterioration. No. 2,198,209. Sidney Musher to Musher Foundation, Inc.

Stabilization of hydrocarbon glyceride and essential oils by substantially crude unrefined cane and beet sugar. No. 2,198,210. Sidney Musher to Musher Foundation, Inc.

Method of rendering fat containing meat. No. 2,198,211. Sidney Musher to Musher Foundation, Inc.

Stabilization of glyceride oils. Nos. 2,198,212-213-215. Sidney Musher to Musher Foundation, Inc.

Retaining carotene content of freshly cut grasses. No. 2,198,214. Sidney Musher to Musher Foundation, Inc.

Method manufacturing substantially stabilized butter. No. 2,198,216. Sidney Musher to Musher Foundation, Inc.

Protecting cream against oxidation. No. 2,198,217. Sidney Musher to Musher Foundation, Inc.

Stabilized wheat gum preparation containing small proportion of milk-solids-not fat and a larger proportion of wheat gum oil. No. 2,198,218. Sidney Musher to Musher Foundation, Inc.

Process producing stabilized glyceride oil resistant to oxidative deterioration. No. 2,198,219. Sidney Musher to Musher Foundation, Inc.

Stabilized oil paste composed of ground roasted peanuts and small proportion of ground unroasted peanuts. No. 2,198,220. Sidney Musher to Musher Foundation, Inc.

Process producing grain whiskey having improved flavor characteristics. No. 2,198,221. Sidney Musher to Musher Foundation, Inc.

Composition comprising glyceride oil normally subject to oxidation and small amount of cocoa butter product capable of resisting oxidation. No. 2,198,222. Sidney Musher to Musher Foundation, Inc.

Aqueous sizing composition and process of preparation. No. 2,198,289. Oscar F. Neitzke to Bennett, Inc.

Process removing bicarbonate anion from water, by use of a metal adduct of a phenolic-formaldehyde resin. No. 2,198,378. Carleton Ellis to Ellis-Foster Co.

Water softening processes. Nos. 2,198,379-381. Carleton Ellis to Ellis-Foster Co.

Carbonized tannin material for water softening and process of making same. No. 2,198,380. Carleton Ellis to Ellis-Foster Co.

Method for drying material dampened with a solvent for oil and the like. No. 2,198,412. Dan McDonald to Engineering, Inc.

Solvent extraction of oil from oleaginous material. Dan McDonald to Engineering, Inc.

Method of making sulfurized cutting oils. No. 2,198,562. Arthur Pollak and Randall Hastings to West Virginia Pulp and Paper Co.

Stable low viscosity concentrated aqueous pigmented casein paint containing sodium formate. No. 2,198,596. Francis Clarke Atwood to Atlantic Research Associates, Inc.

Process for drying glue. No. 2,198,617. Edward H. Hoelscher and Reuben S. Tour to Chemical Products Corporation.

Method for the removal of sulfur compounds from iron. No. 2,198,625. Heinrich Koppers to Heinrich Koppers Gesellschaft mit beschrankter Haftung.

Method of treating waste materials containing organic substances of animal or vegetable origin by mesophile or thermophile anaerobic conversion. No. 2,198,737. Kai Petersen.

Process for tempering glass. No. 2,198,739. Charles John Phillips to Corning Glass Works.

Method of desulfurizing lehr gases. No. 2,198,745. Rowland D. Smith to Corning Glass Works.

Water-resistant cementitious product. No. 2,198,776. George D. King and Thomas P. Camp to United States Gypsum Company.

Hard bituminous material adapted for use as storage battery compound derived from petroleum by precipitation with butane. No. 2,198,777. Kenneth C. Laughlin to Standard Oil Development Company.

Colored asbestos product. No. 2,198,800. Marion S. Badollet to Johns-Manville Corporation.

Production of diazotype light-sensitive layers. No. 2,198,827. Werner Paul Leuch to Eugene Dietzgen Co.

Organic sulfide polymers and mineral oil compositions containing same. No. 2,198,828. Eugene Lieber and Louis A. Mikeska to Standard Oil Development Company.

Method cleansing filter cloths soiled with albuminous and alkaline earth deposits comprises soaking in aqueous solution of a molecularly dehydrated phosphate and thereafter in an aqueous nitrous acid solution. No. 2,198,847. Anton Volz to Hall Laboratories, Inc.

Method for high vacuum fractional distillation. No. 2,198,848. Guenther J. K. von Elbe and Benjamin B. Scott, Jr., to Carnegie Institute of Technology of Pittsburgh.

Process for decaffeinating coffee. No. 2,198,859. Eugen Burgin to Max Brunner & Co.

Method preparing island jelutong for use in chewing gum bases. No. 2,198,865. Richard P. Dyckman to L. A. Dreyfus Company.

Cyclic process for treating water containing acids or salts with certain granular resin. No. 2,198,874. Eric L. Holmes to The Permutit Co.

In production germicide from water-soluble nitrogen base sale solutions, step of adding buffer agent to precipitate the bases from solution in fine state of dispersion. No. 2,198,899. William N. Axe and Douglas D. Henson, to Union Oil Co. of California.

Method reducing silica content of minerals. No. 2,198,972. Charles H. Peddrick, Jr., and Joseph H. Weis to Feldspathic Research Corporation.

Electrical insulating composition consisting of a plurality of organic compounds, the monomeric molecules of each compound having an electrically symmetrical molecular structure and substantially zero electric moment. No. 2,198,977. Helge Rost.

Method protecting trees from sunscald comprises applying aqueous wax emulsion containing finely divided aluminum whereby an opaque film is formed which excludes and reflects light. No. 2,198,991. Walter C. Dutton to The Dow Chemical Company.

Mineral oil composition and process of producing same. No. 2,199,021. Thomas W. Bartram to Monsanto Chemical Company.

Process of refining animal and vegetable oils. No. 2,199,041. Benjamin Clayton to Refining, Inc.

Improvement in art of making lightweight concrete. No. 2,199,046. Sydney T. Evenstad to William F. MacGlashan.

Extreme pressure lubricant comprising an oil-in-water emulsion containing water in excess of 90%, small percentage of potash soap, higher percentage of tallow, and having low free alkali content not in excess of pH 12. No. 2,199,146. Robert C. Williams to The Ironsides Company.

Composition of matter comprising waxy mineral lubricating oil and small amount of an ester formed from a long chain aliphatic alcohol and a cyclic carboxylic acid. No. 2,199,187. Raphael Rosen to Standard Oil Development Company.

Waterproofing compound for building materials containing paraffin wax, drying petroleum oil, paint drier, and heavy naphtha. No. 2,199,193. Emile L. Baldeschwieler and Peter J. Wiezevich to Standard Oil Development Company.

Production lubricating oil from a cracked benzine mainly consisting of aliphatic hydrocarbons and rich in olefines. No. 2,199,200. Herbert Goethel, Paul Schaller, and Heinrich Tramm.

Bituminous emulsion comprising bitumen, water and emulsifying agent. No. 2,199,206. Cornelis Maters and Martinus J. Riemersma to Hercules Powder Company.

Oil and greaseproof container having walls of at least one layer of sheet cellulose and inside coating thereon deposited from composition of 50% oxidized abietic acid, 17% castor oil, and 33% ethyl alcohol, said inside coating preventing escape of oil through cellulose wall. No. 2,199,224. Everett C. Hughes to The Standard Oil Company.

Method crystallizing a crystalline substance from saturated solution. No. 2,199,227. Alvin M. Marks.

As a depilatory, a soluble stannite solution, having pH value less than 12.6, containing stabilizer comprising organic compounds containing at least three alcoholic hydroxyl groups. No. 2,199,249. William B. Stoddard and Julius Berlin.

Method removing substantially whole integument-free juice-cell groups from citrus fruits. No. 2,199,345. Ralph Polk, Sr., and Ralph Polk, Jr., to The Polk Development Company.

Method treating glyceride oil to give novel flavor and odor characteristics and improved stability. No. 2,199,364. Sidney Musher to Musher Foundation, Incorporated.

Composition of matter, substantially free from components which are volatile at room temperature consisting essentially of liquid organic phosphate. No. 2,199,385. Shailer L. Bass to The Dow Chemical Co.

Granular article containing cellulose ethers and shellac. No. 2,199,386. Shailer L. Bass and Earle L. Kropscott to The Dow Chemical Co.

Syrup useful as a milk supplement, said syrup comprising concentrated sugar cane juice, citrus fruit juice, and a partially neutralized citrus fruit juice having acid content insufficient to curdle milk. No. 2,199,522. Martha R. Jones.

Photographic material comprising silver halide emulsion containing a polymethine dye. No. 2,199,542. Walter Konig to General Aniline and Film Corp.

Steps in process for making laminated sheets. No. 2,199,597. Archibald Renfrew and William E. F. Gates to Imperial Chemical Industries, Ltd.

Cleaning composition containing water, metal etching acid, sodium secondary alcohol sulfate and acetone. No. 2,199,712. Howard R. Neilson.

Manufacture of yeast. No. 2,199,722. George de Becze.

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Method making coated abrasives. No. 2,199,752. Nicholas E. Oglesby to Behr-Manning Corp.
Method of irradiating creams and apparatus therefor. No. 2,199,796. Chandler Holt to Bourjois, Inc.
Wetting, cleaning, and emulsifying agent. No. 2,199,806. Robert W. Mitchell to Magnus Chem. Co.
Apparatus and method for treatment and preservation of biologically active substances. Nos. 2,199,815-816-817. Earl W. Flosdorf to the trustees of the University of Penna.
Glass having softening point not less than 1000° C. and capable of being founded at temp. of 1600° C., consisting of 60-70% silica, 25-35% alumina, 6-11% lime, and 1-6% of material from group consisting of magnesia baryta, zinc oxide and thoria. No. 2,199,856. John H. Partridge to General Electric Co.
In preparing plates for lithographic printing, the incorporation of water-soluble halogenated polyvinyl alcohol and additional halogen same as that of compound in solution and applying to plate. No. 2,199,865. William H. Wood to Harris-Seybold-Potter Co.
Process of photographic development. No. 2,199,903. James R. Alburger to Radio Corp. of America.
Photographic developer containing developing agent. No. 2,199,904. James R. Alburger to Radio Corp. of America.
Admixture for concrete including lime, linseed oil, paraffin wax, benzine and adhesive including fish glue and calcium chloride. No. 2,199,-920. Andrew Marzoli.
Fabric waterproofing composition. No. 2,199,933. Norman N. Gay to Standard Oil Co. of Calif.
Process for treating synthetic lubricating oils. No. 2,199,940. Hendrikus Stokman to Shell Development Company.
Antihalation and filter layers for photographic film. No. 2,199,978. Derek E. R. Ayers and Edward B. Knott to Eastman Kodak Co.
Process for starting and balancing azeotropic distillation systems. No. 2,199,982. Arthur W. Bright and John H. Zeigler to Eastman Kodak Company.
Process recovering fatty acids from aqueous solutions. No. 2,199,983. Bernard K. Bright to Eastman Kodak Co.
Preparation vitamin concentrates from oil which contains fat soluble vitamins. No. 2,199,995. Kenneth C. D. Hickman to Distillation Products, Inc.
Process of polychrome photography. No. 2,200,018. Jean Pierre Bertrand.
Opacifier for vitreous enamels. No. 2,200,170. William J. Harshaw and William D. Stillwell to The Harshaw Chemical Co.
Antifreeze composition. No. 2,200,184. Willard L. Morgan to American Maize-Products Co.
Reaction product of compound of inorganic oxygen containing acids group and derivatives thereof with blown fatty alcohol composition. No. 2,200,299. Edwin A. Robinson to National Oil Products Company.
Preparation casein solution relatively stable as to hydrolysis. No. 2,200,353. John P. Alig to Sargent-Gerke Co.
Glass cleaning fluid and the manufacture thereof. No. 2,200,354. Frederic L. Bishop, Jr., to American Window Glass Company.
Highly viscous polymerization products and a process of preparing them. No. 2,200,437. Arthur Voss and Werner Heuer, deceased by Johanna Auguste Asta Heuer, administratrix, to I. G. Farbenindustrie Aktiengesellschaft.
Anticorrosive and antifouling coating and method of application. No. 2,200,469. George Chandler Cox.
Prevention of foaming of aqueous liquids comprises addition of water-insoluble neutral alkyl phosphoric acid ester. No. 2,200,485. Karl Brodersen and Mathias Quaedvlieg to I. G. Farbenindustrie Aktiengesellschaft.
Hydraulic brake fluid comprising diluent and reaction products of polyalkylene glycol monoalkyl ether of at least 6 C atoms in polyglycol radical with vegetable oil of castor and soy bean type. No. 2,200,494. Harvey R. Fife to Carbide and Carbon Chemicals Corp.
Hydraulic brake fluid composed of 10-75% dimethyl ether of tetraethylene glycol combined with 25-90% of castor oil and a viscosity reducing agent. No. 2,200,495. Harvey R. Fife, to Carbide and Carbon Chemicals Corp.
Method preparing platinized silica gel containing promoter agent for use as catalyst. No. 2,200,522. Johann S. Streicher to The American Platinum Works.
Bacterial inoculant for leguminous plants. No. 2,200,532. Varley Sherman Bond to Kalo Inoculant Company.
Insecticide containing phthalonitrile as active ingredient. No. 2,200,564. Milton S. Schecher and Herbert L. J. Haller to Henry A. Wallace, as Secretary of Agriculture of the U. S. and his successors in office.
Method charging capsules with carbon dioxide. No. 2,200,577. Carl F. Lozon.
Purification of liquids by biological means. No. 2,200,580. Max Pruss and Heinrich Blunk.
Insecticide comprising reaction product of nicotine, a vegetable tannin of catechol class and an aldehyde. No. 2,200,582. Elbert M. Shelton to The Tannin Corp.
Process for protection of goods from vermin. No. 2,200,603. Winfrid Hentrich, to Patchem A.-G. zur Beteiligung an Patenten und Sonstigen Erfindungsrechten auf chemische Verfahren.
Method of and composition for cleaning and rendering metal surfaces immune from rust. No. 2,200,615. Clete L. Boyle.
Laminated vitroform sheet. No. 2,200,691. Carleton Ellis to Ellis-Foster Co.
Flocculating aqueous liquids. No. 2,200,784. Fredrick J. Wallace to Robeson Process Company.
Polymerized and strongly oxidized cacao butter having molecular weight of 1050-1500 and iodine value below 24. No. 2,200,858. William Clayton, Sydney Back James, Frederick Morse, and Robert Ian Johnson to Crosse and Blackwell, Ltd.
Denatured alcohol containing an acetylated hardwood oil. No. 2,200,-879. Louis J. Figg, Jr., to Eastman Kodak Co.
Method for crystallizing fats. No. 2,200,982. Carl Dedlow to Swift and Company.
Continuous process for extraction treatment of organic material containing oils, fat or resin and removal of residual solvent from treated material. No. 2,200,983. Clarence F. Dinley to Solvent Machine Co.
Process stabilizing glyceride oil products comprises adding vegetable phosphatidic material. No. 2,201,061. Benjamin H. Thurman to Refining, Inc.
Substantially tasteless and odorless medicinal preparation derived from fish oil and containing vegetable phosphatidic material. No. 2,201,062. Benjamin H. Thurman to Refining, Inc.
Food product having vegetable phosphatidic material incorporated therein. No. 2,201,064. Benjamin H. Thurman to Refining, Inc.
Insecticide containing copper-arsenic-sulfur compounds as essential ingredients. No. 2,201,103. Frederick E. Dearborn to the free use of the People of the U. S.
Denatured ethyl alcohol containing pure allyl cyanide. No. 2,201,108. Paul Mahler and Carl Haner to Publicker, Inc.
Denatured ethyl alcohol containing methyl butyrate. No. 2,201,109. Paul Mahler and Carl Haner to Publicker Inc.
Emulsifying agent comprising essentially a petroleum mahogany sulfonate product. No. 2,201,119. Manuel Blumer, George A. Kessler and Leo Salzman to L. Sonneborn Sons, Inc.

Coal Tar Chemicals

Production wood preservative of creosote-coal tar solution type. Reissue. No. 21,438. Jacquelin E. Harvey, Jr., Robert H. White, Jr., and John J. White, one-half to Southern Wood Preserving Co., and one-half to Jacquelin E. Harvey, Jr.
Diphenyl-polycarboxylic acids containing at least three carboxylic acid groups in the same nucleus. No. 2,197,880. Rudolf Schroter, Heinrich Rinke, and Hubert Eck, to I. G. Farbenindustrie Aktiengesellschaft.
Method producing styrene and neuclear alkyl-substituted styrenes. No. 2,198.185. Herbert Nuggelton Stanley, Gregoire Minkoff, and James E. Youell.
Secondary alkyl cresols in which the secondary alkyl group has from 4 to 6 atoms. No. 2,198,349. Roland R. Read to Sharp & Dohme, Inc.
Ether esters of para hydroxy benzoic acid. No. 2,198,582. Ernest F. Grether and Russell B. Du Vall to The Dow Chemical Co.
Disposal of coke plant waste liquors. No. 2,199,767. Joseph H. Wells and Philip J. Wilson, Jr., to Carnegie-Illinois Steel Corp.
Extraction of phenols from aqueous solutions. No. 2,199,786. Alfred Dierichs and Hans Martini to I. G. Farbenindustrie Aktiengesellschaft.
Method cooling highly reactive low temperature cokes. No. 2,199,945. Arthur A. Archer and Raymond E. Zimmerman to Pittsburgh Coal Carbonization Co.
In destructive distillation of coal tar pitch, an improved process of making substantially pure carbon. No. 2,200,717. Albert P. Meyer to Pittsburgh Coke and Iron Co.
Process treating carbonaceous material with super-heated steam under superatmospheric pressure, releasing pressure, and subjecting material to vacuum treatment. No. 2,201,050. Afred Oberle, Grace Oberle, administratrix of A. O. deceased.

Coatings

Method forming smooth, adherent, impermeable highly corrosion resistant coated metal article. No. 2,198,939. Charles H. Hempel to Heresite & Chemical Company.
Blueprint paper coated with light sensitive composition containing amidine salt of a sulfodi-carboxylic acid ester. No. 2,199,368. Robert B. Barnes and Garnet P. Ham to American Cyanamid Company.
Manufacture of pigmented coating compositions. No. 2,199,557. William Charlton, Eric Everard Walker, and Roy B. Waters, to Imperial Chemical Industrial, Ltd.

Dyes, Stains, etc.

Acid pyronine dyestuffs. No. 2,197,846. Paul Herbert Wolff, deceased by Richard Wenzel, administrator and Karl Frank to General Aniline & Film Corp.
Phthalocyanine dyestuffs. No. 2,197,860. Sebastian Gassner and Berthold Bienert to General Aniline and Film Corp.
Azo compounds and materials colored therewith. No. 2,198,002. Joseph B. Dickey to Eastman Kodak Co.
Acid dyestuffs and a process of preparing them. No. 2,198,298. Paul Wolff and Friedrich Heim to General Aniline and Film Corp.
Triarylmethane dyestuffs capable of being chromed. No. 2,198,468. Paul Herbert Wolff, deceased by Richard Wenzel, administrator and Karl Frank to General Aniline & Film Corp.
Production of new azo dyestuffs containing chromium. No. 2,198,701. Hans Kaemmerer and Ludwig Neumann and Robert Schweizer to General Aniline & Film Corporation.
Acid azo dyestuffs and their manufacture. No. 2,199,043. Achille Conzetti to J. R. Geigy, A. G.
Acyl derivatives of azo dyestuffs and process of preparing same. No. 2,199,048. Charles Graenacher, Franz Ackerman, and Heinrich Bruengger to Society of Chemical Industry in Basle.
Anthraquinone dyestuffs. No. 2,199,176. Robert N. Heslop and William W. Tatum to Imperial Chemical Industries Limited.
Soluble egg dye. No. 2,199,201. Folke Heden to Fred Fear & Co.
Vat dyestuffs of the naphthindenone series. No. 2,199,566. Karl Koeberle Werner Rohland and Christian Steigerwald to General Aniline and Film Corp.
Vat dyestuffs of the peri-naphthindenone series. No. 2,199,567. Karl Koeberle, Werner Rohland and Christian Steigerwald to General Aniline & Film Corp.
Process for the selective reduction of azo compounds. No. 2,199,576. Sqanie S. Rossander to E. I. du Pont de Nemours & Co.
Triarylmethane dyestuffs. No. 2,199,577. Karl Schmidt to General Aniline and Film Corp.
Aminoanthraquinones. No. 2,199,813. Fritz Baumann, Heinz-W. Schwechten, Artur Krause and Robert Zell, to General Aniline and Film Corp.
Azo dyestuffs insoluble in water and fiber dyed therewith. No. 2,199,-814. Walter Broker to General Aniline and Film Corp.
Method of improving the stability of alkaline solutions of phenolic azo dyestuff components. No. 2,199,925. Theodorus P. Wilhelmus Sanders and Jacob van Rensen to Naamlooze Vennootschap Chemische Fabrick L. van der Grinten.
Azo compounds and process for dyeing therewith. No. 2,199,987. Joseph B. Dickey and James G. McNally to Eastman Kodak Co.
Azo compounds and process for coloring therewith. No. 2,200,004. James G. McNally and Joseph B. Dickey to Eastman Kodak Co.
Azo dye compounds and material colored therewith. Nos. 2,200,005-006. James G. McNally and Joseph B. Dickey to Eastman Kodak Co.
Azo dyestuff, dyes vegetable fiber bluish red to brown shades which can be discharged to pure white bath in neutral and alkaline reacting mediums. No. 2,200,040. Hans Roos to General Aniline and Film Corp.
Vat dyestuffs of the anthraquinone series. No. 2,200,324. Erich Berthold and Joachim Mueller to General Aniline and Film Corp.

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Manufacture of new azo dyestuffs. No. 2,200,414. Wilfred Herbert Cliffe to Imperial Chemical Industries, Ltd.

Monoazo dyestuffs and their manufacture. No. 2,200,423. Adolf Krebser to J. R. Geigy & Co.

Azo dyestuffs containing a heavy metal in a complex form. No. 2,200,445. Ernst Fellmer to General Aniline and Film Corp.

Azo compounds and material colored therewith. No. 2,200,543. Joseph B. Dickey and James G. McNally to Eastman Kodak Company.

Dyestuffs of the pyrazinocyanine series and process of making them. No. 2,200,689. Wilhelm Eckert and Ferdinand Quint to General Aniline and Film Corp.

Bis-pyrazolonyl color former. No. 2,200,924. Andrew B. Jennings and Edmund B. Middleton to du Pont de Nemours & Co.

Diazo derivatives of cyclic guanidyl sulfonic acids. No. 2,200,926. Hans Z. Lecher, Frederic H. Adams and Henry Philip Orem to American Cyanamid Co.

Dyestuffs of the triarylmethane series. No. 2,200,938. Ernst Teupel, Ottmar Wahl to General Aniline and Film Corp.

Monazo intermediates. No. 2,200,949. Miles Augustinus Dahlen and Frithjof Zwilgmeyer, to E. I. du Pont de Nemours & Co.

Vat dyeing composition comprising vat dye and a hydroxy acetone as reducing agent for said vat dye. No. 2,201,010. Henry Papini to Warwick Chemical Co.

Equipment and Apparatus

Reaction tower charged with fillers for treating gases and vapors with liquids. No. 2,197,935. Car ten Doornkaat Koolman to American Lurgi Corp.

Apparatus and method for control of flow of air, gases and the like. No. 2,197,949. Herbert A. Reece to Meehanite Metal Corp.

Construction of water cooling towers. No. 2,197,970. Robert Benjamin Elmer 2/3 to L. G. Mouchel & Partners, Ltd., and Pierre Joseph.

Method constructing glass-lined metal conduits for chemicals. No. 2,198,149. Heinrich Bangert.

Centrifuge tube comprising a tubular body formed of one piece of molded transparent synthetic resin with accurately determined graduations. No. 2,198,256. Henri G. Levy.

Gas-liquid contact apparatus. No. 2,198,305. Robert B. P. Crawford.

Apparatus for and method of selecting fractions from fractioning condensers. No. 2,198,325. Glenn E. Wynn and Robert G. Huggins to Mid-Continent Petroleum Corp.

Hydrometer and arrangement for remote control of liquids. No. 2,198,351. Ernst Martin Thielers, Sten Daniel Vigren and Sven H. Kafsten.

Waste liquor recovery apparatus. No. 2,198,446. Leslie S. Wilcoxson to The Babcock Co.

Hydrocarbon burner adapted to burn non-volatile hydrocarbon fuels. No. 2,198,485. George Pirich.

Device for softening water, more particularly boiler feed water. No. 2,198,542. Erich Kocks and Josef Mehren to Deutsch Rohrenwerke Aktiengesellschaft.

Catalytic contact heat exchange apparatus. No. 2,198,555. Dustin W. Wilson, and Stanley J. Chute to The M. W. Kellogg Co.

A jet assembly in an emulsor. No. 2,198,614. James Burton Hayes.

Heat exchanging device. No. 2,198,671. Vilem Kulka.

Tray type sulfuric acid converter. No. 2,198,795. Nicolay Titlestad to Chemical Construction Corporation.

A radiation pyrometer system for measuring temperature of rods. No. 2,199,082. Jacob C. Peters to Leeds & Northrup Company.

Method and apparatus for separating solids of different gravities. No. 2,199,091. Frank Pardee to Anthracite Separator Company.

Apparatus constructed and arranged to color articles by spattering dye irregularly thereon. No. 2,199,093. Harry C. Wolfenden.

Spray apparatus for liquid chemical compounds. No. 2,199,110. Peter P. Metz.

An evaporator for producing a high grade distillate from very impure water. No. 2,199,320. Sergius von Le Juge.

Calcining apparatus. No. 2,199,384. Victor J. Azbe.

Process of vacuum distillation. No. 2,199,994. Kenneth C. D. Hickman to Distillation Products, Inc.

Temperature control system. No. 2,200,241. William J. McGoldrick and Alwin B. Newton, to Minneapolis Honeywell Regulator Co.

Vapor pressure device. No. 2,200,261. Samuel C. Carney to Phillips Petroleum Co.

Heat exchange device. No. 2,200,355. Fritz G. Cornell, Jr., to Jensen Creamery Machinery Company, Inc.

Continuously operated vertical chamber or retort ovens for the production of gas and coke. No. 2,200,371. Heinrich Koppers to Koppers Co.

Coke-oven battery arrangement. No. 2,200,377. Joseph van Ackeren to Koppers Co.

Method and apparatus for freezing water. No. 2,200,424. Benjamin F. Kubaugh to Henry Vogt Machine Co., Inc.

Tubes for use in oxidizing or reducing media under conditions of intermittent heating, said tubes made of rustless iron alloy. No. 2,200,545. Alexander L. Feild to Rustless Iron and Steel Corp.

Heat exchanger and absorber. No. 2,200,788. Joseph A. Coy.

Apparatus for removal of surface metal from slabs, billets, or the like. No. 2,200,816. James L. Anderson to Air Reduction Co.

Apparatus for measuring ultraviolet radiations. No. 2,200,853. Thomas R. Porter and William L. Sullivan to Westinghouse Electric and Manufacture Co.

Apparatus for extracting and collecting dust from air or gases. No. 2,200,891. Tage George Nyborg ½ to the Mining Engineering Co., Ltd.

Process of and apparatus for heating materials. No. 2,200,930. Bert Harrison McQueer to Speer Carbon Co.

Method and apparatus for eliminating moisture from gas or air. No. 2,200,980. Arthur J. Boynton and Gilbert D. Dill to H. A. Brassert and Co.

Drying apparatus and method. No. 2,201,038. Henry F. Hagemeyer to Castings Patent Corp.

Apparatus for pasteurizing liquids. No. 2,201,056. Richard Seligman to The Aluminum Paint and Vessel Co., Ltd.

Explosives

Progressive-burning smokeless powder and method of manufacture. No. 2,198,746. Harold M. Spurlin and Gustave H. Pfeiffer to Hercules Powder Company.

Granular ammonium nitrate explosives. Nos. 2,199,217-218. Melvin A. Cook, Donald B. Gawthrop, and Milton H. Wahl and Clifford A. Woodbury to E. I. du Pont de Nemours & Co., Inc.

Fine Chemicals

Alkaline earth metal gold keratinates and process of making same. No. 2,197,795. Adolf Feldt and Adolf Schmitz to Schering Aktiengesellschaft.

Method of producing esters. No. 2,197,798. Henry B. Gans, Jr., and Arthur B. Holton.

Reaction of aliphatic hydrocarbons with sulfur dioxide and chlorine and products thereof. No. 2,197,800. Clyde O. Henke and William H. Lockwood to E. I. du Pont de Nemours & Co.

Liquid esters of natural higher fatty acids obtained by hydrolysis of a glyceride oil, said esters having use as drying oils. No. 2,197,813. Frank A. Strauss to Wecoline Products, Inc.

Sexual Hormones and method of preparing them. No. 2,197,853. Wilhelm Dirscherl, and Fritz Hanusch to Rare Chemicals, Inc.

Method for the production of an alkali metal salt of a mono-alkyl trithiocarbonate. No. 2,197,964. William T. Bishop to Hercules Powder Co.

Arylo-pyrrolinethione compounds and process of producing. No. 2,198,166. William Edward Hanford to E. I. du Pont de Nemours & Co.

Methacrylate of 3-methyl-3 hydroxy butanone-2. No. 2,198,172. Russell McGill to E. I. du Pont de Nemours & Co.

Preparation of a dialkyl acetylene. No. 2,198,236. Thomas H. Vaughn to Carbide and Carbon Chemicals Corp.

Process for the production of nitrogen-containing alpha beta-unsaturated ketones. No. 2,198,260. Johannes Andreas van Melsen to Shell Development Company.

Hydroxylated 2-aryl-pseudonaphthazimides. No. 2,198,300. Gerald Bonhote and Carl Apotheker to Society of Chemical Industry in Basle.

Bismuth of Ethyl-N-Caproate and a process of making it. No. 2,198,357. Laszlo Vargha to Gedeon Richter.

Production of glycide nitrate. No. 2,198,367. Helmut Jacobi and Walter Flemming to I. G. Farbenindustrie Aktiengesellschaft.

Crotonic acid ester of polyhydric alcohol. No. 2,198,373. Herman A. Bruson to Rohm and Haas Co.

A cyclic alkylation process comprising condensing several compounds in presence of a cationoid condensing agent. No. 2,198,374. Herman A. Bruson and John W. Kroeger to Rohm and Haas.

Hydrogenation product of an isophorone, having at least 15 C atoms, which product contains polyalkylated cyclohexanols and cyclohenones. No. 2,198,375. Herman A. Bruson to Rohm and Haas Co.

Ether esters of nuclear substituted salicylic acids. No. 2,198,583. Ernest F. Grether and Russell B. Du Vall to The Dow Chemical Co.

In recovery glycerol dichlorohydrin from aqueous solution step of extracting said solution with inert water-immiscible organic solvent. No. 2,198,600. Edgar C. Britton and Harold R. Slagh to The Dow Chemical Company.

Fully acetylated sugar acid chlorides and process for their production. No. 2,198,628. Randolph T. Major and Elmer W. Cook to Merck & Co., Inc.

B-alkylcholine salts and their acyl esters. No. 2,198,629. Randolph T. Major and Howard T. Bonnett to Merck & Co., Inc.

Stable solutions of calcium thiosulfate and a process for the manufacture thereof. No. 2,198,642. Josef Vonkennel and Josef Kimmig to Schering Aktiengesellschaft.

Mixed acetate butyrate ester of a polyglycol. No. 2,198,665. Walter E. Gloor to Hercules Powder Company.

Manufacture of alkali metal formaldehyde sulfoxylate. No. 2,198,682. Lee B. Smith to General Chemical Company.

Guanidine xanthate. No. 2,198,774. Alphons O. Jaeger and Richard Herrlinger to American Cyanamid & Chemical Corporation.

Sulfonic derivatives of amides. No. 2,198,806. Albert K. Epstein and Morris Katzman to The Emulsol Corporation.

Process of introducing double bonds into aliphatic compounds. No. 2,198,884. Kurt A. F. Pelikan, Erich F. R. Schuelke, and Donatus von Mikusch-Buchberg, to Woburn Degreasing Company.

As new composition of matter, a high molecular weight heteropolymer of SO_2 and CH_2:$CHCH_2CN$. No. 2,198,936. Frederick E. Frey and Robert D. Snow and Louis H. Fitch, Jr., to Phillips Petroleum Co.

Method of manufacturing esters. No. 2,198,946. Nicolaus Moskovits to Agricultural & Chemical Works Public Co., Ltd., by Shares.

Condensation product consisting of at least two pyrene radicals joined to each other by an alkylene group. No. 2,198,967. Heinrich Hopff and Hans Schoenherr to General Aniline & Film Corporation.

Diazo derivatives of guanidyl carboxylic acids. No. 2,199,003. Hans Z. Lecher, Robert P. Parker, and Henry Philip Orem to American Cyanamid Co.

Process for the manufacture of side-chain aromatic compounds. No. 2,199,131. Lawrence H. Flett to National Aniline & Chemical Company.

Sulfur compounds and method of synthesizing the same. No. 2,199,361. Bert H. Lincoln and Gordon D. Byrkit to Continental Oil Company.

Nitro-Salicylidene compounds. No. 2,199,389. Edgar C. Britton and Clarence L. Moyle to The Dow Chemical Co.

Method parting gold bullion anode of any purity comprises electrolytically dissolving gold in bath initially comprising concentrated HCl free of gold salts. No. 2,199,391. Samuel J. Blaut.

Production surface active material comprises reacting tertiary amine with mixture of straight chain oxygen-containing aliphatic acids. No. 2,199,397. Max Engelmann to E. I. du Pont de Nemours & Co.

Method sulfating saturated aliphatic compound. No. 2,199,398. Max Engelmann to E. I. du Pont de Nemours & Co.

Method sulfating an unsaturated primary aliphatic alcohol. No. 2,199,399. Max Engelmann to E. I. du Pont de Nemours & Co.

Long chain normal primary alkenylsulfates of group consisting of myristoleyl sulfate and palmitaleyl sulfate. No. 2,199,403. Clyde Overbeck Henke and Frank McGrew Schofield to E. I. du Pont de Nemours & Co.

Manufacture of 1-methyl-4-chloro-5-hydroxynaphthalene-1'-sulfonic acid. No. 2,199,568. Hans Lange and Otto Hoffmann to General Aniline and Film Corp.

Production oxygenated organic compounds by partial oxidation of aromatic hydrocarbons. No. 2,199,585. William A. Bone and Dudley M. Newitt to Imperial Chemical Industries, Ltd.

Process for the synthesis of chlorinated, unsaturated hydrocarbons. No. 2,199,633. Herman B. Kipper.

Production of alkoxy-hydroxy benzaldehydes. No. 2,199,748. Ewart Mather and William E. Hamer to Monsanto Chemicals, Ltd.

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Dehydrohalogenation of alpha-chloroisobutyric esters with zinc and zinc halides. No. 2,199,774. Harold J. Barrett to E. I. du Pont de Nemours & Co.

Imidazolines containing sulfuric acid radicals and process of preparing them. No. 2,199,780. August Chwala and Edmund Waldmann to I. G. Farbenindustrie Aktiengesellschaft.

Addition products of thiophenols and acrylic acid esters. No. 2,199,-799. Ralph A. Jacobson to E. I. du Pont de Nemours & Co.

Process for stabilizing organic heavy metal salts. Nos. 2,199,828-829. Mihai Bogdan to Shell Development Co.

Esters of 6-amino-nicotinic acid. No. 2,199,839. Raemer R. Renshaw and Paul F. Dreisbach to Pyridium Corp.

Method of treating hydrocarbon mixtures. No. 2,199,841. Gabriel E. Rohmer 1/10 to Carl P. Geopel.

Manufacture of soluble alkali chromates. No. 2,199,929. Alfred E. Van Wirt to Imperial Paper and Color Corp.

Process of preparing higher halogenated ketones. No. 2,199,934. Paul Heisel and Albert Hendschel to I. G. Farbenindustrie Aktiengesellschaft.

Hypochlorous acid solutions and method of making same. No. 2,199,-936. Hans O. Kauffmann to Buffalo Electro-Chemical Company, Inc.

Process for producing nitrogen trichloride. No. 2,199,942. Erich Staudt to Naamlooze Vennootschap Industrieele Maatschappij Voorheen Noury and Van Der Lande.

Process which comprises reaction of Bz-1-alkoxybenzanthrones with primary aromatic amine in presence of caustic alkali and basic organic solvent. No. 2,199,575. Georg Rosch to General Aniline and Film Corp.

Production of high-molecular unsaturated ketones and conversion products thereof. No. 2,200,216. Kurt Loewenberg and Karl Smeykal to I. G. Farbenindustrie Aktiengesellschaft.

N-substituted aspartic acids and their functional derivatives and process of producing them. No. 2,200,220. Walter Reppe and Hanns Ufer to I. G. Farbenindustrie Aktiengesellschaft.

Method chlorinating saturated aliphatic hydrocarbons under the influence of light. Nos. 2,200,254-255. Harry Bender to The Dow Chemical Co.

Boron carbide composition and method of making the same. No. 2,200,258. John A. Boyer to The Carborundum Co.

Vapor phase catalytic hydrogenation of adiponitrile. Nos. 2,200,282. Wilbur A. Lazier to E. I. du Pont de Nemours & Co.

Modified fatty alcohol and process for producing same. No. 2,200,298. Edwin A. Robinson to National Oil Products Co.

Compound having reactive methylene groups. No. 2,200,306. Wilhelm Schneider and Alfred Frohlich to General Aniline and Film Corp.

Male sex hormone compound. No. 2,200,307. Walter Schoeler, Max Gehrke, and Friedrich Hildebrandt to Schering Corp.

Process for the recovery of pure phenols or phenolate from gas liquor or the like. No. 2,200,370. Heinrich Koppers, to Koppers Co.

Production of carbon disulfide. No. 2,200,475. Eberhard Legeler to I. G. Farbenindustrie Aktiengesellschaft.

3.3′-dihalogen-dianthrahydroquinoneazine tetrasulfuric acid esters and process of making the same. No. 2,200,480. Otto Stallman, to E. I. du Pont de Nemours & Co.

Barbituric acid compound. No. 2,200,538. William G. Bywater to Parke, Davis & Co.

Interpolymerization products of butadiene and a vinyl ethinyl carbinol. No. 2,200,705. Wilhelm Sandhaas, Walter Daniel, and Kornelius Muhlhausen to I. G. Farbenindustrie Aktiengesellschaft.

Process for the refining of naphthenic acids. No. 2,200,711. Hugh Rogers Berry to Shell Development Co.

Tri benzyl substituted phenyl phosphites. No. 2,200,712. Thomas S. Carswell to Monsanto Chem. Co., St. Louis.

Manufacture of nitriles. No. 2,200,734. Herrick R. Arnold and Wilbur A. Lazier to E. I. du Pont de Nemours and Co.

Imidazoline derivatives and process of making the same. No. 2,200,815. Robert Radcliffe Ackley to The Richards Chemical Works, Inc.

Improvement in method making acicular zinc oxide by oxidation of zinc vapor. No. 2,200,873. Howard M. Cyr to The New Jersey Zinc Co.

Method of producing elemental sulfur by reaction between sulfureted hydrogen and sulfur dioxide. No. 2,200,928. Axel Rudolf Lindblad and Fritz Olov Herneryd to Imperial Chemical Industries, Ltd.

Process for producing sodium acetylide. No. 2,200,941. Richard Rockhill Vogt to E. I. du Pont de Nemours & Co.

Anthracrysone-2, 6-dialdehyde and a process of preparing the same. No. 2,200,057. Georg Kranzlein and Fritz Roemer to General Aniline and Film Corp.

Unsaturated ethers and method of making same. No. 2,201,074. Edgar C. Britton and Harold R. Slagh to The Dow Chemical Co.

Unsaturated derivatives of compounds of the cyclopentano polyhydro phenanthrene series and a process of producing the same. No. 2,201,121. Adolf Butenandt and Friedrich Hildebrandt to Schering Corp.

Dispersible hydrophilic sulfur. No. 2,201,124. Philip J. Ehman and Walter O. Walker to Ansul Chemical Co.

Industrial Chemicals

Process for drying lactose. No. 2,197,804. Charles O. Lavett to Buffalo Foundry and Machine Co.

Catalytic polymerization process for unsaturated gases. No. 2,197,862. Julius Hyman to Velsicol Corp.

Process of concentrating phosphate bearing minerals. No. 2,197,865. Herbert B. Johnson to Ritter Products Corp.

Production olefines from paraffins comprises passing paraffins with sulfur vapor under dehydrogenating conditions over catalyst comprising alumina promoted by sodium aluminate. No. 2,197,872. George S. Monroe and Vladimir N. Ipatieff to Universal Oil Products Company.

Production finely divided insoluble anhydrite. No. 2,197,953. Roy William Sullivan to E. I. du Pont de Nemours & Co.

Vapor phase dehydration of acetylenic alcohols. No. 2,197,956. Thomas H. Vaughn to Union Carbide and Carbon Research Labs., Inc.

Process for electrolysis of aqueous alkali sulfate solutions. No. 2,198,-045. Robert Suchy and Georg Messner to I. G. Farbenindustrie Aktiengesellschaft.

Process of producing esters and ethers. No. 2,198,046. Karl Vierling to I. G. Farbenindustrie Aktiengesellschaft.

Production conversion products of pyrene consists in bringing pyrene in vapor phase in a vigorous stream into contact with walls heated to temp. 600-850° C. No. 2,198,050. Heinrich Hopff and Hans Schroenherr to General Aniline and Film Corp.

Process for recovery desirable liquefiable constituents from gas which is initially at high pressure within retrograde condensation range of said constituents. No. 2,198,098. William H. Vaughan to Tide Water Associated Oil Co.

Butyl alcohol fermentation process. No. 2,198,104. Edwin H. Carnarius to Commercial Solvents Corp.

Process for reducing corrosion and composition of matter of reduced corrosiveness towards ferrous metals. No. 2,198,151. Herman A. Beekjuis, Jr., and William De Forest Macomber to The Solvay Process Company.

In hydrogenation of maleic anhydride containing impurities which are catalytic poisons, the improvement comprising contacting said anhydride with catalyst and hydrogen at pressure between 10 and 100 atoms. No. 2,198,153. Kenneth W. Coons to National Aniline and Chemical Company, Inc.

Process treating olefin rich hydrocarbon mixture to effect polymerization of said olefins. No. 2,198,180. Louis C. Rubin to The Polymerization Process Corp.

Method preparing calcium carbonate in form of relatively fine, slow-setting particles. No. 2,198,223. Irving E. Muskat and Frederick Gage to Pittsburgh Plate Glass Co.

Production of substituted amines comprises catalytically hydrogenating an aryl nitro compound in liquid phase in presence of strong acid. No. 2,198,249. Clyde O. Henke and John V. Vaughn to E. I. du Pont de Nemours & Co.

Method utilizing values in waste pickle liquors which includes mixing a quantity thereof with waste bauxite and carbon and sintering same. No. 2,198,372. Blakeslee Barnes to Chemical Construction Corp.

Method for purification of liquids. No. 2,198,393. Pieter Smit to N. V. Octrooien Maatschappij.

A diphenylene oxide composition. No. 2,198,473. Frank M. Clark to General Electric Co.

Method of making a synthesis gas mixture of carbon monoxide and hydrogen. No. 2,198,553. George Roberts, Jr., Dustin W. Wilson, and Percival C. Keith, Jr. to The M. W. Kellogg Co.

Method for the production of hydrogen. No. 2,198,560. Walton H. Marshall, Jr., to The M. W. Kellogg Co.

Process conditioning superphosphate by evolving ammonia from a calcined phosphate and a mineral ammonium salt, and passing it through superphosphate. No. 2,198,592. Johnson Hagood to Southern Phosphate Corporation.

Process for the alkylation of aromatic compounds. No. 2,198,595. James L. Amos, Robert R. Dreisbach, and Jack L. Williams to The Dow Chemical Company.

Method of carbonating lime. No. 2,198,640. Horace E. Stump.

Process for preparing white lead. No. 2,198,641. Edward D. Turnbull to The Glidden Co.

Method separating mixtures of water-soluble alcohol, acetone and substance selected from group consisting of aldehydes, cyclic ethers, and polymerization products made therefrom. No. 2,198,651. Joseph E. Bludworth to Celanese Corporation of America.

Method for purifying H_2SO_4 containing nitrogen-oxygen compound impurities by use of urea. No. 2,198,686. William E. Watson to General Chemical Company.

Process for purifying industrial combustible gases at nearly atm. pres. No. 2,198,743. Paul Moritz Schuftan.

In conversion of unsaturated C_4 fractions of hydrocarbons containing all three butenes in substantial amounts into high knocks rating motor fuels, improvement of adjusted olefin composition to obtain an isobutylene concentration at least equal to the concentration of normal 2-butene in said C_4 hydrocarbon fraction and subsequently subjecting olefin mixture to catalytic polymerization. No. 2,199,132. Carl M. Hull to Standard Oil Company.

Improvement in process of converting unsaturated C_4 fraction of a commercial hydrocarbon gas mixture into motor fuel octanes of high knock rating. No. 2,199,133. Robert F. Marschner to Standard Oil Company.

Process of producing a carbon monoxide-hydrogen mixture. No. 2,199,-475. William D. Wilcox.

Production normal propyl benzene. No. 2,199,564. Vladimir N. Ipatieff and Herman Pines to Universal Oil Products Co.

Recovery of sulfuric acid from hot gas containing same. No. 2,199,-691. Bernard M. Carter to General Chemical Co.

Process removing organic impurities from chlorine gas. No. 2,199,797. Ralph M. Hunter to The Dow Chemical Co.

Process of polymerization of acetylene to nonbenzenoid hydrocarbons of higher molecular weight and catalysts therefor. No. 2,200,057. Albert S. Carter and Frank W. Johnson to E. I. du Pont de Nemours & Co.

Reissue. Method for continuous hydrogenation of unsaturated material which contains hydrocarbon nucleus of rosin acid. No. 21,448. Rollin J. Byrkit, Jr., to Hercules Powder Co.

Reissue. Process for the hydrogenation of olefin polymers. No. 21,450. Edwald D. Pyzel, deceased, by Shell Development Co., Assignee.

Process for making fatty acids. No. 2,200,279. Hans Kaufmann.

Process of extracting and refining glycerides and products resulting therefrom. No. 2,200,390. Stephen Edward Freeman to Pittsburgh Plate Glass Company.

Solvent extraction of glyceride oils. No. 2,200,391. Stephen E. Freeman to Pittsburgh Plate Glass Co.

Process for the removal of acid impurities from ammoniacal liquor. No. 2,200,400. Heinrich Sollner to Koppers Co.

Interpolymerization of ethylene. No. 2,206,429. Michael Willcox Perrin, Eric W. Fawcett, John Greves Paton and Edmond G. Williams to Imperial Chemical Industries, Ltd.

Production of lower boiling hydrocarbons from higher boiling hydrocarbons comprises subjecting vapors and steam to elevated temperature in presence of potassium carbonate. No. 2,200,463. Clive M. Alexander to Cyro Process Co.

Recovery of by-products from black liquor. No. 2,200,468. Francis J. Cirves.

Production of sulfur. No. 2,200,529. Hans Baehr and Karl Braus to I. G. Farbenindustrie Aktiengesellschaft.

Method of removing the solvents from solutions of resilient substances. No. 2,200,554. Adolf Kampfer.

Method commercially producing substantially pure hydrogen gas. No. 2,200,607. Albert R. Stryker, 1/4 to Chester Tietig.

Method producing salt brine of substantially uniform saturation. No. 2,200,665. Frank L. Bolton.

Manufacture of alkali metals and alkali metal hydroxides. No. 2,200,-906. Thomas Wood.

Metals, Alloys

Steel alloy having elevated chromium content. No. 2,197,955. Emanuel Valenta to Electro-Metallurgical Co.

In production porous metal bodies, use of metal powders whose pouring weight amounts to less than 2.0 kilograms per litre and carrying out

sintering at temp. 650° C. No. 2,198,042. Leo Schlect and Karl Ackermann to I. G. Farbenindustrie Aktiengesellschaft.
Sintered hard metal alloy consisting of about 60% tantalum carbide, 5% titanium carbide, 11% niobium carbide, 20% tungsten carbide and about 4% auxiliary metal substantially of the iron group. No. 2,198,343. Richard Kieffer to American Cutting Alloys, Inc.
Alloy composed of 56% Ag, 27% Pd, 14% Cu, 2% au, 1% zn. No. 2,198,400. Reginald V. Williams.
Vanadium-free ferrous alloy composition containing C, Si, Mn, Cr, Mo, W. No. 2,198,476. Joseph V. Emmons, to Cleveland Twist Drill Co.
Austenitic alloy steel containing 12-25% Cr, 6-14% Mn, .05-.5% N, not more than .2% C, remainder iron. No. 2,198,598. Frederick M. Becket and Russell Franks to Electro Metallurgical Company.
Improvement in process of introducing metal powder into mold comprises flowing powder into mold by vibrating particles while maintaining less than atmospheric pressure in interstices between particles. No. 2,198,612. Charles Hardy, to Hardy Metallurgical Corporation.
Process for the manufacture of aluminum. No. 2,198,673. Hirsch Loevenstein one-half to Israel Jacob Foundaminsky.
Process of hardening copper alloys. No. 2,198,719. Claude H. Coleman.
Magnesium alloy containing 1.23-5.22% Al, .78-3.6% Zn, .045-.36% Mn, .09-72% Ni, .06-60% steel, 90.16-97.63% Mg. No. 2,198,762. Fritz Christen.
Ferrous alloy comprising 2.25-4.00% C, 1.5-3.5% Si, .05-.60% Ti, .50-1.50% Cu, .30-1.00% Mn, 40-2.00% Cr, balance Fe. No. 2,198,775. Walter E. Jominy to General Motors Corporation.
Process converting white iron casting into malleable iron. No. 2,198,801. Alfred L. Boegehold to General Motors Corporation.
Treatment of materials containing tantalum and niobium with a view to recovering separately an alloy rich in niobium and poor in silicon and carbon, and an alloy rich in tantalum and poor in silicon. No. 2,198,914. Joseph Pierre Leemans to Societe Generale Metallurgique de Hoboken.
Compact lead alloy for use against corrosion of chemical agents contains .3 to 13% Sb, .2-5% Hg, .1-.6% Zn, .005-1% Ca, .2-1% Bi, balance Pb. No. 2,198,932. Francois Cuvelliez to Societe Generale Metallurgique de Hoboken.
Alloy steel which is stainless in the hardened martensitic condition. No. 2,199,096. Karl T. Berglund to Sandvikens Jernverks Aktiebolag.
Method conditioning ferrous body comprises subjecting it to temp. great enough to cause iron chlorides to volatilize in non-oxidizing atm. comprising HCl and having moisture content low enough to permit iron chloride to be formed at said temp. No. 2,199,418. John C. Redmond and Ralph W. Hodil.
Process removing nickel and chromium from iron ore. No. 2,199,654. Kenneth M. Simpson.
Process for the recovery of uranium and vanadium from carnotite ores. No. 2,199,696. Herman Fleck, Herman S. Fleck administrator of said H. Fleck.
Method of concentrating radium bearing ores. No. 2,199,697. Herman Fleck, Herman S. Fleck, administrator of said H. Fleck, deceased.
Alloy containing 25-55% Au, 2-6% Pd, 10-30% Ag, 9-25% Zn, and remainder copper. No. 2,200,050. Max Auwarter and Konrad Ruthardt to W. C. Heraeus G. m. B. H.
Process for recovery of metals from alloys and metallurgical residues. No. 2,200,139. Clarence B. White.
Corrosion-resisting ferrous alloy. No. 2,200,208. James A. Parsons, Jr., to The Duriron Company, Inc.
Process for recovering metals from solutions. No. 2,200,357. Albert B. Doran to Dorex, Inc.
Process of making metallic molding powders. No. 2,200,369. Louis G. Klinker to Johnson Bronze Co.
Solvent for removing coating of nickel from iron bearing base. No. 2,200,486. Earl F. Burdick to Western Electric Co.
Method producing magnetic alloys in finely divided form. No. 2,200,491. Robert P. Cross, Jr., and Arthur N. Ogden to Western Electric Company, Inc.
Method preparing ores to facilitate extraction of desired metals. No. 2,200,563. Kenneth M. Simpson.
Metallurgical addition agent comprising metal powder and free phosphorus which under certain conditions combine exothermically. No. 2,200,742. Charles Hardy to Hardy Metallurgical Co.
Method of making a composition of phosphorus and metal. No. 2,200,743. Charles Hardy, to Hardy Metallurgical Co.
Heat treatment of cast iron. No. 2,200,765. Edward L. Bartholomew and John D. Paine, Jr., to United Shoe Machinery Corp.
Method coating metal articles by cathode disintegration within an evacuated chamber. No. 2,200,909. Bernhard Berghaus and Wilhelm Burkhardt. Burkhardt to Berghaus.
Forgable alloy steel containing 8.5% Mo, 8.5% Cr, 1% W, 4% Co, 175-1.5% V, .3-.65% C, balance substantially Fe. No. 2,201,072. Edgar F. Blessing to Chas. W. Guttzeit.
Improvement in heat treatment of metals by process of quenching in fused salt baths, comprises maintaining pH of quenching medium below 7. No. 2,201,111. Josef M. Michel to I. G. Farbenindustrie Aktiengesellschaft.

Paper and Pulp

Process for purifying wood pulp. No. 2,198,065. Lyle Melvin Sheldon and Lionel Elmer Goff to Cellulose Research Corp.
Pulp bleaching apparatus. No. 2,198,709. George H. Tomlinson.
Process bleaching ground wood pulp comprises contacting said pulp with alkaline solution containing peroxide. No. 2,199,376. Joseph S. Reichert, Samuel A. McNeight and Howard L. Potter to E. I. du Pont de Nemours & Co., Inc.
Process making open-textured high strength paper. No. 2,199,750. Howard D. Meincke to A. M. Meincke & Son, Inc.
Manufacture of papers having low affinity for adhesives. No. 2,199,862. Florian Strovink to Bennett, Inc.
Water-resistant laminated paper and method of manufacture. No. 2,200,839. Louis C. Fleck, to Paper Patents Co.

Petroleum

Polymerized hydrocarbon composition. No. 2,197,768. Mathias Pier, and Friedrich Christmann to I. G. Farbenindustrie Aktiengesellschaft.
Improved lubricant comprising mineral lubricating oil and condensation product of paraffin wax. No. 2,197,769. Mathias Pier and Friedrich Christmann to I. G. Farbenindustrie Aktiengesellschaft.
Lubricant composition comprising hydrocarbon oil and reaction product of perchloromethyl-mercaptan with an unsaturated organic material. No. 2,197,781. Darwin E. Badertscher and Henry G. Berger and Francis M. Geger to Socony-Vacuum Oil Co.
Apparatus for catalytic treatment of hydrocarbons in vapor state. No. 2,197,799. Lon S. Gregory to Phillips Petroleum Co.
Mineral oil composition. Nos. 2,197,832-837. Orland M. Reiff to Socony-Vacuum Oil Co., Inc.
In polymerization of light unsaturated mineral oil, step comprising subjecting oil to action of solid, porous, synthetic aluminum silicate under pressure. No. 2,197,861. Julius Hyman to Velsicol Corp.
Process refining gasoline-like distillates containing mercaptans. No. 2,197,873. Jacque C. Morrell and Wayne L. Benedict to Universal Oil Products Co.
Method extracting gasoline from natural gas. No. 2,198,142. Henry H. Wade to Parkhill-Wade.
Distillation and stabilization process for production of gasoline. No. 2,198,263. David G. Brandt to Power Patents Co.
Mineral oil composition and improving agent therefore. Nos. 2,198,274-275. Orland M. Reiff, Ferdinand P. Otto, John J. Giammaria and Edward A. Oberright to Socony-Vacuum Oil Company, Inc.
Improved mineral oil composition comprising viscous mineral oil fraction having mixed therewith minor proportion of metal salt of an aryl ether acid. No. 2,198,292. Orland M. Reiff, Ferdinand P. Otto, to Socony-Vacuum Oil Co., Inc.
Improved mineral oil composition containing minor portion of oil-miscible alkyl-substituted aryl ether acid. No. 2,198,293. Orland M. Reiff and Ferdinand P. Otto to Socony-Vacuum Oil Co.
Lubricating composition comprising hydrocarbon oil and in admixture a salt of a polyvalent metal. No. 2,198,307. Gerald A. Hope, William L. Linton and Malcolm F. Pratt, to Socony-Vacuum Oil Co.
Process for producing oils free of asphalt. No. 2,198,388. Max Landau.
Process for treating gasoline like hydrocarbon fractions of low anti-knock value to increase octane number thereof. No. 2,198,545. Morris Levine to Danciger Oil & Refineries, Inc.
Method subjecting cycle condensate to cracking conditions of temp. and pres. in cracking zone to effect conversion into lower boiling hydrocarbons. No. 2,198,557. Luis de Florez, Frank L. Herle, and Joel H. Hirsch to De Florez Engineering Co., Inc.
Method completing a well comprises employing as a drilling fluid a suspension of bentonite, $CaCo_3$ and water to build up substantial wall coating and thereafter removing coating by treating with acid. No. 2,198,563. William W. Robinson, Jr., to The Texas Co.
Recovery of lubricating oil from acid sludge. No. 2,198,566. Judson Bruce Synnott, Jr., to The Texas Co.
Method manufacturing high viscosity index lubricating oils. Nos. 2,198,575-576. Francis X. Grovers to Indian Refining Co.
Method prospecting for buried hydrocarbon deposits by soil gas analysis. No. 2,198,619. Leo Horvitz to Esme E. Rosaire.
Improved normally liquid lubricating oil containing mineral oil, aluminum soap, and small percentage of high boiling ester. No. 2,198,851. Peter J. Wiezevich, John C. Zimmer, and Arnold J. Morway to Standard Oil Development Co.
Process catalytically converting normally gaseous olefin hydrocarbons of more than 2 C atoms per molecule into polymers predominately of gasoline boiling range. No. 2,198,937. Frederick E. Frey, Paul V. McKinney and William H. Wood to Phillips Petroleum Company.
A viscous hydrocarbon oil having incorporated a small proportion of at least one compound consisting of C, H, N and ethereal oxygen. No. 2,198,961. Melvin A. Dietrich to E. I. du Pont de Nemours & Co.
Process for the conversion of normally gaseous mono-olefins to normally liquid products. No. 2,199,180. Kenneth C. Laughlin to Standard Oil Development Company.
Production of petroleum phenols. No. 2,199,208. John J. Owen to Standard Oil Devevlopment Co.
Lubricating oil and method of preparing the same. No. 2,199,352. Charles C. Towne to The Texas Company.
Anhydrous lubricant. No. 2,199,695. Marcellus T. Glaxman to Union Oil Co. of Calif.
Method coking hydrocarbon oils. No. 2,199,759. Harry G. Schnetzler to Standard Oil Company (Chicago).
Method removing carbonaceous deposits from contact mass. No. 2,199,837. Eger V. Murphree to Standard Oil Development Co.
Improvement in process of regenerating a solid adsorbent contact catalyst containing combustible contaminants. No. 2,199,838. Charles Wesley Tyson and Charles E. Hemminger to Standard Oil Development Co.
Process treating petroleum stock containing asphaltic impurities. No. 2,199,930. John Walsko to Sinclair Refining Co.
Improvement in refining lubricating oil, comprises use of nitrobenzine and sulfuric acid. No. 2,199,931. John Walsko to Sinclair Refining Co.
An extreme pressure lubricant. No. 2,199,944. Adrianus Johannes van Peski and Johannes Andreas van Melsen to Shell Development Co.
Improved diesel fuel comprising hydrocarbon fuel oil containing .1-10% chloropicrin. No. 2,200,260. Alvin A. Burton to Standard Oil Co. (Calif.)
Asphaltic composition and method of preparing same. No. 2,200,484. Augustus H. Batchelder to Standard Oil Company of California.
Lubricating oil having relatively low pour point. No. 2,200,534. Ulric B. Bray to Union Oil Co. of Calif.
Process removing gum forming components from hydrocarbon oil vapors. Nos. 2,200,703-704. Edmond R. P. E. Retailliau to Shell Development Co.
Manufacture of improved asphalt. No. 2,200,914. Robert E. Burk and Charles H. Whitacre to Standard Oil Company (Ohio).
Process producing lubricating oil of high quality from wax-free hydrocarbon mixture. No. 2,201,120. Ernst Bosing to Edeleanu Gesellschaft, m.b.H.

Pigments

Pigmented lacquer emulsion and method of making. No. 2,198,669. Henry Jenett and Samuel Meeker to Interchemical Corporation.
Manufacture of titanium dioxide pigments. No. 2,200,373. Assur Gjessing Oppegaard and Charles J. Stopford to Titan Company, Inc.
Manufacture of antimony trioxide pigments. No. 2,200,478. Kurt Schirrmeister to I. G. Farbenindustrie Aktiengesellschaft.

Resins, Plastics

Reissue. Process and compound for polishing plastics. No. 21,432. Joseph Lupo, Jr.
Inorganic acid—modified natural resins. No. 2,197,855. Donald Finlayson and Leonard Latham to Celanese Corporation of America.

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Die for forming plastic materials into threads or riggons. No. 2,197,988. Mario Tanzi to the John B. Canepa Co.

A homogeneous mixed resinous material, the reaction product of a petroleum solvent tar and a phenol with a formaldehyde resinifying agent in presence of strong mineral acid catalyst. No. 2,198,318. Alexander N. Sachanen and Pharez G. Waldo to Socony-Vacuum Oil Co., Inc.

Process for rapid solution of vinyl resins. No. 2,198,794. Carleton N. Smith to Carbide and Carbon Chemicals Corporation.

Process making pressed and cured laminated resinous article. No. 2,198,805. Edward R. Dillehay to The Richardson Company.

Process for fabrication of extrusion products from polymerization products of a butadiene. No. 2,198,927. Hein I. Waterman and Willem L. Johannes de Nie to Shell Development Co.

Manufacture artificial material from polyvinyl compounds. No. 2,198,970. Hans Muller to Siemens-Schuckertwerke Aktiengesellschaft.

Preparation chlorinated aromatic resins. No. 2,199,026. Arthur A. Levine and Oliver W. Cass to E. I. du Pont de Nemours & Co.

Method of injecting thermoplastic material into a mold. No. 2,199,144. John B. Tegarty to The Standard Products Company.

An odorless transparent infusible hot-pressed article, resistive to action of alkali and of orange to reddish brown color. No. 2,199,155. Alphonse Gams and Gustave Widmer to Ciba Products Corporation.

Method producing resinous composition of improved shock resistance comprises admixing alkyd resin with heat hardenable non-alkyd resin. No. 2,199,900. George S. Weith to Bakelite Corp.

Hydrogen-stabilized polyvinyl acetal resin. No. 2,199,992. Joseph B. Hale to Eastman Kodak Co.

Production of resins from aldehydes and aromatic hydrocarbons. No. 2,200,762. George K. Anderson, Edward A. Taylor, John B. Fishel to The Neville Co.

Production of aldehyde-aromatic hydrocarbon resins. No. 2,200,763. George K. Anderson, Edward A. Taylor and John B. Fishel to The Neville Co.

A mixer for plastic materials. No. 2,200,875. Terry W. Edwards and Charles H. Nagel, to The Firestone Tire & Rubber Co.

Thermosetting molding composition comprising formaldehyde-urea reaction product and N-Methyl saccharin as latent accelerator. No. 2,201,021. Emil H. Balz to Plaskon Company, Inc.

Cyanthioformamide as latent accelerator in formaldehyde-urea molding composition. No. 2,201,027. David E. Cordier to Plaskon Company, Inc.

Thermosetting molding composition comprising a formaldehyde-urea reaction product and certain organic plasticizer. No. 2,201,028. David E. Cordier to Plaskon Co., Inc.

Rubber

Process of sponge rubber manufacture. No. 2,197,894. Henry R. Minor to Industrial Process Corp.

Method for reducing the viscosity of chlorinated rubber. No. 2,198,973. John M. Peterson to Hercules Powder Company.

Process vulcanizing rubber in presence of accelerating agent comprising tetra-amyl thiuram monosulfide, an amyl thiourea and an amyl urea. No. 2,199,002. Albert J. Laliberte to United States Rubber Company.

Method incorporating gas black in rubber in presence of member of class consisting of oxygen and activated oxygen in amount greater than ordinarily present in air. No. 2,199,099. Edward N. Cunningham to The B. F. Goodrich Company.

Vulcanization of rubber in presence of compound of class consisting of diaryl dithiocarbamic acids, their salts, and their esters and a member of class consisting of mercaptathiazoles and dithiazyl sulfides. No. 2,199,105. Paul C. Jones to The B. F. Goodrich Company.

Process and apparatus for spinning rubber thread from rubber latex. No. 2,199,882. Toyohachiro Inokuchi and Uichi Kawarahata to Toyo Gomu Kagakukogyo Kabushiki Kaisha.

Vulcanization of rubber comprises heating in presence of sulfur and certain metallic organic compounds. No. 2,199,979. David J. Beaver to Monsanto Chemical Co.

Process converting plurality of strips of expandable unvulcanized material into integral vulcanized sheet of unlimited length. No. 2,200,262. Frederick M. Daley and Ludolf H. DeWyk to The Sponge Rubber Products Co.

Blowing agent for sponge rubber. No. 2,200,473. Albert F. Hardman, to Wingfoot Corp.

Method preserving rubber comprises vulcanizing in presence of compound of group consisting of secondary N-furfuryl N-aryl amines. No. 2,200,525. Charles F. Winans to Wingfoot Corp.

Age resisting rubber containing member of group consisting of N. methylene orylene diamine omega sulfonic acids and the N-methylol arylene diamines. No. 2,200,526. William D. Wolfe to Wingfoot Corp.

Process of isomerizing rubber. No. 2,200,715. Arthur Greth and Johannes Reese to The Resinous Products and Chemical Company.

Apparatus for making continuous length of vulcanized rubber. No. 2,200,735. Harold T. Battin to U. S. Rubber Co.

Antioxidant, containing major portion of alkylated secondary aromatic amine material, for preservation of rubber. No. 2,200,747. Louis H. Howland to United States Rubber Co.

Method preserving organic substances (rubber) which tend to deteriorate by absorption of oxygen, comprises use of a polymeric C-alkenyl substituted diarylamine. No. 2,200,756. William E. Messer and Henry H. Bassford, Jr., to United States Rubber Co.

Process of vulcanizing sponge rubber. No. 2,200,847. Evelyn William Madge, Wylde Green and Albert A. Round and Thomas Norcross to Dunlop Rubber Co., Ltd.

Flameproofing sponge rubber and method of flameproofing. No. 2,200,850. Charles O. Miserentino to Dunlop Tire and Rubber Corp.

Rubber hydrochloride composition. No. 2,201,034. Erich Gebauer-Fuelnegg, deceased by Marie Gebauer-Fuelnegg, administratrix and Eugene W. Moffett to Marbon Corp.

Textiles

Manufacture of yarns containing staple fiber from yarns composed of continuous filaments. Nos. 2,197,856-857. Donald Finlayson and Leonard Latham to Celanese Corp. of America.

Artificial wool-like product comprising crimped fibers of synthetic linear polymer. No. 2,197,896. John B. Miles, Jr., to E. I. du Pont de Nemours & Co.

Method eliminating tendency of cellulose organic derivative cut staple yarns to accumulate static electricity by use of cyclohexyldialkylamine salt of a sulfated aliphatic alcohol containing at least 10 c atoms. No. 2,197,930. Wallace T. Jackson and Wendell G. Faw to Eastman Kodak Company.

Yarn conditioning process. Nos. 2,198,000-001. Joseph B. Dickey and James G. McNally to Eastman Kodak Co.

Process for manufacturing artificial fiber from protein contained in soybean. No. 2,198,538. Toshiji Kajita and Ryohei Inoue, to Showa Sangyo Kabushiki.

Process improving tenacity of artificial materials comprises subjecting some to stretching operation in presence of agent selected from group consisting of wet steam and hot water at a temp. above 100° C. No. 2,198,660. Henry Dreyfus.

Method continuously dyeing fabric. No. 2,199,233. Sumner H. Williams to General Dyestuff Corporation.

Fabric dyeing method and apparatus. No. 2,199,342. Charles R. Johnson to Bigelow-Sanford Carpet Co., Inc.

Process treating textile fabric which comprises applying finishing oil subject to oxidative deterioration on exposure to air. No. 2,199,363. Sidney Musher to Musher Foundation, Incorporated.

Dry-heat shrunk synthetic linear polyamide filament. No. 2,199,411. Everett V. Lewis to E. I. du Pont de Nemours & Co.

Textile assistants, particularly adopted for use as reserving agents. No. 2,199,776. Fritz Becherer to J. R. Geigy A. G.

Textile assistants and their manufacture namely, soluble salts of desoxybenzoin—sulfonic acids. No. 2,199,789. Kurt Engel and Kurt Pfaehler to J. R. Geigy A. G.

Yarn conditioning processes and compositions therefor. Nos. 2,199,986-988-989. Joseph B. Dickey and James G. McNally to Eastman Kodak Co.

Process for producing shrinkage effects in textiles. No. 2,200,134. Paul Schlack to I. G. Farbenindustrie Aktiengesellschaft.

Method and apparatus for liquid treatment of rayon. No. 2,200,197. George M. Allen, Henry J. McDermott and John W. Pedlow to American Viscose Corp.

Process for the dyeing and printing of acetate artificial silk. No. 2,200,343. Heinrich Ritter, to General Aniline and Film Corp.

In process saponifying textile materials containing organic ester of cellulose, steps of subjecting fabric to saponifying bath of saponifying agent and fine oil. No. 2,200,383. Cyril M. Croft to Celanese Corp. of America.

Production and treatment of fabrics having different crepe effects. No. 2,200,389. Donald Finlayson and Joseph Rowland Wylde, to Celanese Corp. of America.

Process finishing linen materials which include steps of treating material with quaternary ammonium salt capable of producing water repellency and swelling water repellent material with alkaline swelling agent to improve wear-resistance. No. 2,200,944. Frederick Charles Wood to Tootal Broadhurst Lee Co., Ltd.

Process giving yarns and woven and knitted fabrics an improved soft and suede-like finish by treating with stearic acid diethylene triamine. No. 2,201,041. Jacob Katz to Warwick Chemical Co.

Reducing composition useful for textile printing, dyeing, and other purposes. No. 2,201,042. Jacob Katz to Warwick Chemical Co.

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CHEMICAL INDUSTRIES

Statistical and Technical Data Section

No. 6
Part 2

Abstracts of Foreign Patents

By E. L. Luaces, Chemical Consultant

To assist those making use of this summary, it might be well to comment briefly on the system used by each of these countries in reporting patents.

Canada grants the patent on the date of publication. It does not print the patents, but supplies typewritten certified copies at a cost averaging about five dollars each.

English "patents" here reported are known as *Complete Specifications Accepted* and are open to opposition by interested parties for a period of two months from date of publication. Printed copies may be obtained at ls. ld. each.

French patents are granted several months before publication, and the printed report issued several days or even weeks after its date. Printed copies may be obtained at 10 francs each.

Belgian patents, like French, are granted long before publication. The report comes out 12 times each year, and photostatic copies can be obtained at from 3.50 to 4.50 francs per page.

In this digest the latest available data will be published, but it will be understood that some delay will occur as a result of present conditions in Europe. The German patents will be reported just as soon as we are sure of uninterrupted service.

We shall be glad to receive comments or criticisms.

BELGIAN PATENTS

Granted August 31, 1939; Published February 29, 1940.

Mixture of beer yeast with flour, to which is added vitamin D. No. 435,518. Scheldemolens S. A.

Special steel, of very high strength, which is not affected by cooling after welding, containing about 0.2% C, 1.8% Mn, 0.4% Si, 0.6% Cr, 0.3-1% Mo and 0.3-0.8% Va. No. 434,751. Societa Italiana Aeroplani Idrovolanti "Voia-Marchetti."

Sedimentation apparatus. No. 435,443. Dorr Company, Inc.

Cylinder press for the agglomeration of carbon and other finely divided substances. No. 435,494. W. Pfahl.

Chemical composition comprising methyl borate diluted in a liquid chemically and physically compatible which contains substantially less than 50% oxygen. No. 435,526. I. G. Farbenindustrie A. G.

Steel comprising 0.08-0.2% C, 0.8-1.3% Mn, about 0.35% Si, and 0.08-0.4% Va. No. 435,529. Kohle und Eisenforschung G. m. b. H.

Improved alloy of density between 10 and 15 for use in powdered metal technology. No. 435,560. The General Electric Company Limited.

Process and apparatus for lining pipe and similar articles with bitumin. No. 435,564. (See also Nos. 435,565 and 435,566.) S. A. des Hauts-Forneaux et Fonderies de Pont-a-Mousson.

Process for obtaining linings which may be colored on surfaces of magnesium and magnesium alloys. No. 435,623. I. G. Farbenindustrie A. G.

Process for the recovery of metallic iron from scories resulting from the desulfurization of cast iron with soda. No. 435,647. Vereinigte Huttenwerke Burbach-Eich-du-Delingen A. G.

Process for the manufacture of high test oleum or of SO_3-base mixtures. No. 435,187. S. A. Appareils et Evaporateurs Kestner.

Process for the manufacture of basic ether salts. No. 435,365. Société pour l'Industrie Chimique a Bale.

Process for the manufacture of basic ether salts and amides of extranuclear alicyclic-aliphatic or aromatic-alicyclic-aliphatic acids having a principal aliphatic chain. No. 435,366. Société pour l'Industrie Chimique a Bale.

Emulsifying apparatus. No. 435,378. Usines Puratos S. P. R. L.

Oxidation of liquid hydrocarbons with means of a gas containing oxygen in the presence of oxidation catalysts. No. 435,379. E. I. du Pont de Nemours & Co., Inc.

Production of zinc compounds by electrolyzing zinc-containing industrial waste using a mercury cathode, and treating the malgam thus produced to obtain compounds of zinc. No. 435,391. I. G. Farbenindustrie A. G. *and* Duisburger Kepferhutte.

Non-toxic microbicide comprising a cyclic chain diphenol or homologue in solution in an agent miscible with water and slightly volatile at ordinary temperature. No. 435,394. F. Gauchard.

Process for the preparation of polyethynes and their derivatives. No. 435,404. Dr. Alexander Wacker Ges. fur Elektrochemische Industrie G. m. b. H.

Coke Oven. No. 435,415. F. Puening.

Process of manufacturing acrolein in which the crude mixture obtained by condensation of ethyl aldehyde and formic aldehyde is submitted, in vapor phase, to a partial condensation. No. 435, , Deutsche Gold- und Silber Scheideanstalt.

Process for catalytic isomerization of oximes of cyclohexanones in which the cyclohexanone oxime is passed in vapor phase over a dehydrating catalyst at a temperature of 200-500°. No. 435,435. E. I. du Pont de Nemours & Co., Inc.

Process for the preparation of mixture for the rubber industry and similar industries, by addition to rubber of residual products from the refining of mineral oils. No. 435,452. Naftolen-Gesellschaft zur Verwertung der Rostler Mener'schen Verfahren m. b. H.

Process for the manufacture of dye intermediates in which cholic acid chlorides containing hydroxyl in which the hydroxyl groups are esterified, are reacted with compounds containing amino group with form dyes. No. 435,454. (See also No. 435,455.) I. G. Farbenindustrie A. G.

Process for the preparation of alcohols of the acetylene series in which the acetylene is brought into contact with a mixture of acetone and an aqueous solution of alkaline reaction. No. 435,471. I. G. Farbenindustrie A. G.

Process for the decarburation of calcium cyanamide. No. 435,472. Société Belge d'Electrochemie.

Process for the manufacture of granular calcium cyanamide. No. 435,473. Société Belge d'Electrochimie.

Basic condensation products resulting from the condensation of sulfured phenols with aliphatic amines, primary or secondary, and formaldehyde. No. 435,498. J. R. Geigy S. A.

Process for the manufacture of hydroxylammonium salts. No. 435,501. I. G. Farbenindustrie A. G.

Process for the preparation of nitriles. No. 435,550. E. I. du Pont de Nemours & Co., Inc.

Process for the manufacture of black pigments from iron oxide. No. 435,580. (See also No. 435,581.) I. G. Farbenindustrie A. G.

Process for the manufacture of superphosphate and at the same time enriching it with phosphoric acid. No. 435,592. Aktiebolaget Kemiska Patenter.

Process for the stabilization of chlorhydrate and other rubber hydrohalogenation products. No. 435,601. Wingfoot Corporation.

Process for the preparation of aliphatic polyureas. No. 435,666. E. I. du Pont de Nemours & Co., Inc.

Process for the manufacture of butadiene in which butadiene or gaseous mixtures containing it are mixed with carbonic anhydride before being passed over a dehydrogenation catalyst, maintaining the temperature between 500 and 700°. No. 435,703. Instituto per lo Studio della Gomma Sintetica *and* G. Natta.

Addition of up to 2% of an alpha amino acid to casein to be used for the manufacture of textiles. No. 435,698. J. Carlier.

Process and apparatus for the production of chemical foam, and particularly of fire-extinguishing foam. No. 435,513. Walther & Cie. Aktiengesellschaft.

CANADIAN PATENTS

Granted and Published April 23, 1940.

Cleaning compound consisting of pasty substance formed by dissolving soap flakes, trisodium phosphates and soda ash with sodium metasilicate in water. No. 388,157. Charles Isaac Austin.

Abrasive article comprising abrasive grains embedded and dispersed in a sintered matrix consisting of ductile silver base alloy containing at least one other metal held in solid solution in the silver. No. 388,202. The Carborundum Company.

Abrasive article consisting of abrasive diamonds and sintered bond composed principally of aluminum and containing an aluminum base alloy, and a hardening agent consisting of an intermetallic compound of alumium and a metal of the iron group in such quantity as to harden the bond without destroying its ductility. No. 388,203. The Carborundum Company.

Abrasive article comprising diamonds and a sintered metal bond consisting principally of a ductile copper base solid solution containing between 5 and 15 per cent. tin. No. 388,204. The Carborundum Company.

Process of converting organic sulfonates of a particular cation to sulfonates of a different cation. No. 388,205. Colgate-Palmolive-Peet Company.

Thermo-chemical removal of metal from metallic bodies. Nos. 388,207 and 308,208. Dominion Oxygen Company, Ltd.

Continuous process for chlorinating and volatilizing chromite ores. Nos. 388,211 and 388,212. The Dow Chemical Company.

Rubber and viscose adhesive. No. 388,214. E. I. du Pont de Nemours & Co., Inc.

Method of avoiding pitting in electrodeposition of metals. No. 388,215. Eaton Manufacturing Company.

Retarding deterioration of rubber by treatment with a reduced reaction product of phenyl-beta-naphthylamine and acetone. No. 388,221. The B. F. Goodrich Company.

Manufacture of vitamin B_1 by reacting 2-methyl-2-alkoxy-3-chlorotetrahydrofurane with 2-methyl-4-amino-5-thioformylamino-methyl-pyrimidine. No. 388,227. F. Hoffmann-LaRoche & Co. Limited Company.

Production of highly chlorinated metal-free phthalocyanine by suspending it in molten phthalic anhydride in presence of a halogen carrier and passing chlorine until metal-free phthalocyanine has adsorbed from 12 to 16 chlorine atoms per molecule. No. 388,229. Imperial Chemical Industries Limited.

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Foreign Chemical Patents

Belgian, Canadian, English and French—p. 20

Manufacture of depolarizer from brownstone. No. 388,232. Leclanché S. A.
Bleaching cellulosic materials without substantial degradation of fibres by suspending said materials in aqueous solution of sodium hydroxide, introducing chlorine dioxide thereinto, and removing the bleached materials. No. 388,237. The Mathieson Alkali Works (Inc.).
Polymerization of olefines with an active metal halide catalyst. No. 388,247. Shell Development Company.
Arylides of 2:3-hydroxynaphthoic acid. No. 388,252. Society of Chemical Industry in Basle.
Treatment of filaments, threads, yarns, etc., with aqueous solution of a liquid hygroscopic polyhydric alcohol of concentration at most of 50% and a substance of mildly alkaline reaction. No. 388,268. Henry Dreyfus.
Composition comprising cellulose acetate and, as a modifier, N-di-(acetoxy-ethyl)-p-toluene-sulfonamide. No. 388,269. Henry Dreyfus.
Packaged dye material for dyeing mixed textile material in a single bath. No. 388,270. Camille Dreyfus.

Granted and Published April 30, 1940.

Process for reconditioning dry-cleaning solvents. No. 388,276. Lars Hugo Bergman and Horace Garfield Waite.
Production of permanently delustered textile materials, foils, films, etc., by esterification of them or the like having a base of organic substitution derivatives of cellulose which have been uniformly or locally delustered by hot aqueous liquors or moist steam. No. 388,286 (See also No. 388,287.) Henry Dreyfus.
Treatment of magnesium or production of magnesium alloys employing as flux mixture of magnesium fluoride with a sulfide of Mg, Ca, or Al, in atmosphere of reducing gas or inert gas. No. 388,291. Daniel Gardner.
Method of providing cracks in predetermined locations in a pulp grinding wheel. No. 388,315. Hans P. Scheel, Jr.
Production of therapeutic agents having valuable analgesic and antipyretic properties by reacting alpha-furoic acid chloride with an orthohydroxy carboxylic acid of the benzene series in an organic solvent in presence of a hydrochloric acid binder. No. 388,339. The Bayer Co., Inc.
Process for producing solid polymers from ethylene which are tough solids at normal temperatures and correspond substantially to $(CH_2)n$; n being over 140; melting point 100-120° C., and mol.wt. at least 6000. No. 388,355. Canadian Industries Limited.
Preparation of hexoic acids by oxidizing a hexaldehyde in presence of soluble copper compound as sole catalyst. No. 388,376. Carbide and Carbon Chemicals Ltd.
Preparation of phenyl methyl pyrazyl phenyl methyl pyrazolone. No. 388,377. Carbide and Carbon Chemicals Ltd.
Production of boron carbide. No. 388,378. The Carborundum Company.
Process and apparatus for nodulizing carbon black. No. 388,382. Columbian Carbon Company.
Process for electroplating brass. No. 388,387. E. I. du Pont de Nemours & Co., Inc.
Production of fertilizer by adding to acidic fertilizer materials a liquid containing formamide, ammonia, a relatively small quantity of water, and sodium nitrate. No. 388,388. E. I. du Pont de Nemours & Co., Inc.
Improvement in process of manufacture of basic calcium arsenate by addition of arsenic acid to lime slurry. No. 388,389. E. I. du Pont de Nemours & Co., Inc.
Manufacture of acid-anthraquinone dyestuffs by condensing an anthraquinone or leuco-anthraquinone compound with an aminodiphenylether of the benzene series. No. 388,391. J. R. Geigy S. A.
Manufacture of alkyl esters of beta-acetaminobutyric acid by catalytic hydrogenation of beta-acetamino crotonic acid. No. 388,395. F. Hoffmann-LaRoche & Co. Limited Company.
Depilatory comprising about 40% to 70% of resinous material and a complement of the soft asphalt of the residue of crude oil distillation. No. 388,396. Industrial Patents Corporation.
Use of cellulose acetate in manufacturing waterproof, open-mesh, form-retaining hats and other articles. No. 388,400. Interknit A. G.
Rot-proofing and water-proofing materials with alkaline aqueous dispersion of neutral naphthenic acid metallic compounds and a waterproof aqueous dispersion of rubber. No. 388,407. National Processes Limited.
High temperature resistant glaze comprising a mixture of 300 mesh zircon and phosphoric acid. No. 388,417. Power Patents Company.
Isomerization of olefine hydrocarbons by contacting catalyst comprising hydrated aluminum silicate having base-exchange properties at from 275-500° C. No. 388,423. Shell Development Company.
Azo-dyestuff metal compound. No. 388,425. Society of Chemical Industry in Basle.
Azo dyestuffs. No. 388,426. Society of Chemical Industry in Basle.
Removing CS_2 from coke-oven light oil by contacting with ammonia and caustic soda solutions. No. 388,453. Benjamin D. Sontag.
A rubber-adherent article comprising a ferrous-metal object, covering of zinc thereon, covering of copper on said zinc and of nickel on said copper, and method of manufacturing rubber adherent wire. No. 388,454. William W. De Lamatter.

Granted and Published May 7, 1940.

Process for improving the properties of materials having a basis of organic cellulose ester, such as filaments, etc., by saponifying by treatment with guanidine or derivatives so as to remove at least 20% of the initial acidyl content of the ester. No. 388,478. Henry Dreyfus.
A method of producing an opaque oxide coating, having a milkly white color resistant to permanent staining by adsorption, on an aluminum surface. No. 388,501. Aluminum Company of America.
Froth flotation agent comprising a mixture of at least two aliphatic carboxylic acids containing from 5 to 10 carbon atoms, at least one acid being unsaturated. No. 388,503. Armour and Company.
Oil modified synthetic resin of low acid number comprising combined chemical equivalent amounts of glycerol, phthalic anhydride and oil acids contained in acid oil. No. 388,513. Canadian Industries, Limited.
Preparation of methyl acetate by contacting 100 parts carbon monoxide and 5 parts dimethyl ether with activated carbon, using hydrogen chloride as catalyst, at between 200 and 400° C and 25 to 900 atmospheres. No. 388,514. Canadian Industries Ltd.
Interpolymer prepared by reacting a polymeric ester of an acid selected from the group comprising acrylic acid and alpha hydrocarbon substituted acrylic acids with alcohol boiling higher than the alcohol whose radical forms part of the polymeric ester. No. 388,515. Canadian Industries Limited.
Acetylene generator. Nos. 388,527 and 388,528. Dominion Oxygen Co., Ltd.
Preserving rubber by incorporating therein a methyl isopropyl phenyl naphthylamine. No. 388,530. Dominion Rubber Co., Ltd.
Preserving rubber by incorporating therein a polymeric C-alkenyl substituted secondary acrylamine. No. 388,531. Dominion Rubber Co., Ltd.
Preserving rubber by incorporating therein 2,2-dialkyl-2,3-dihydro perimidine. No. 388,532. Dominion Rubber Co., Ltd.
Process for further alkylating partially alkylated trihydric alcohol by reacting a sodium alkoxide of it with methyl chloride in presence of a solvent and at 80 to 150° C and atmospheric pressure. No. 388,533. E. I. du Pont de Nemours & Co., Inc.
Process comprising dissolving chloro-2-butadiene-1,3 in non-polymerizable solvent, then dispersing the solution in water and polymerizing the chloro-2-butadiene-1,3 in presence of H_2S. No. 388,534. E. I. du Pont de Nemours & Co., Inc.
Polymerizing butadiene by contacting butadiene with an addition compound of an alkali metal and a polycyclic aromatic hydrocarbon, said addition compound consisting of one mole of said hydrocarbon chemically combined with two atoms of said alkali metal. No. 388,535. E. I. du Pont de Nemours & Co., Inc.
Counter-current oil extraction apparatus using solvent under pulsating pressure. No. 388,536. E. I. du Pont de Nemours & Co., Inc.
Corrosion-inhibiting alkali composition for cleaning metalware, consisting of about 85% water soluble inorganic alkaline detergent, 5-6% solid hypochlorite of alkali or alkaline earth metals, and 9-10% water soluble zinc salt. No. 388,542. (See also No. 388,543.) The Griffith Laboratories, Limited.
Preparation of wetting agent by monochlorinating a kerosene fraction boiling between 160-245° C. No. 388,553. Monsanto Chemical Company.
Detergent comprising essentially a mixture of monosulfonated alkylated benzene hydrocarbons. No. 388,554. Monsanto Chemical Company.
Anhydrous caustic soda compound of fluffy, porous particles obtained by removing the water from a solution of caustic soda of at least 50% concentration by application of substantially anhydrous liquid ammonia. No. 388,563. (See also No. 388,564.) Pittsburgh Plate Glass Company.
Process of forming internal cavities in milled toilet soap to cause it to float. No. 388,565. The Procter and Gamble Company.
Producing alcohols by subjecting an olefine to action of dilute aqueous solution of aluminum sulfate and sulfuric acid at pressure of 100-600 atmospheres and temperature of 100-374° C. No. 388,569. Shell Development Company.
Process for removal of acid component from hydrocarbon distillate. No. 388,570. Shell Development Company.
Conversion of normally gaseous olefines to higher boiling polymers by contacting at polymerizing temperature with catalyst comprising a gel of a group IV metal and a compound of a different group IV metal. No. 388,572. Shell Development Company.
Rubberlike products by treating plastic or elastic saturated aliphatic type iso olefine hydrocarbon polymer having mol.wt. below 4000 with at least 1% by wt. of agent comprising sulfur halide. No. 388,573. Standard Oil Development Company.
Method of reacting 2-mercaptobenzothiazole, formaldehyde, and urea in presence of HCl. No. 388,583. Wingfoot Corporation.
Vulcanization of rubber in presence of reaction product of a halomide of a dibasic acid and a dithio acid. No. 388,585. Wingfoot Corporation.
Vulcanization of rubber in presence of a thiazole type accelerator and a guanidine salt of a dithiocarbamic acid derived from a primary amine. No. 388,586. Wingfoot Corp.
Vulcanization of rubber in presence of an S-aroyl N,N diaralkyl dithiocarbamate. No. 388,587. Wingfoot Corporation.
Production of alkali metal sulfide by reacting an alkali metal amalgam with an aqueous solution of the corresponding alkali metal polysulfide. No. 388,588. Luigi Achille.
In method of forming staple fibres or filaments of relatively short lengths, incorporating therewith an emulsion in water of an electrolyte, a mineral oil, and a sulfonated fatty alcohol compound. No. 388,589. (See also Nos. 388,590 to 388,592 incl.) Camille Dreyfus.
Heat- and light-resistant polymerization product of at least one vinyl ester, including a vinyl halide, which product contains small amount of a metal soap having a metallic radical selected from the group of metals consisting of alkali and alkaline earth metals, Cd, Pb, and Mn. No. 388,600. Carbide and Carbon Chemicals Limited.

Granted and Published May 14, 1940.

Production of artificial materials having an increased affinity for acid dyestuffs, by reacting yarns, etc., having a base of organic derivatives of cellulose containing or yielding free hydroxy groups with ammonia under pressure until a product containing nitrogen is obtained. No. 388,610. Henry Dreyfus.
Production of brucite in granular form consisting in calcining brucite-bearing limestone, hydrating the calcined products, and separating the resulting granules from the hydrated lime thereby produced. No. 388,635. Monson Fraser Goudge.
Composition comprising an ice color coupling component and a reaction product of an ice color diazo component with a guanyl-urea, the guanylurea portion of the molecule being free from substituents capable of azoic coupling. No. 388,639. American Cyanamide Company.
Liquid adhesive composition comprising malodorant-free plastic polymerized chloroprene and compounding ingredients all dispersed in a solvent therefor, and diethylamine and an ethanolamine in the total proportion by weight in the neighborhood of 5% of the polymerized chloroprene. No. 388,649. Boston Blacking Co. of Canada, Ltd.
Arc welding flux comprising: siliceous clay 25-60%, manganese dioxide 75-40%. No. 388,652. Canadian General Electric Company, Ltd.
Arc welding flux comprising: manganese dioxide 13-19%, feldspar 20-11%, ilmenite 27-39%, ferro-manganese 24-16%, kaolin up to 6%, ferro-titanium 10-8% (which may be replaced in part by a large quantity of ferro-chorimium). No. 388,653. Canadian General Electric Company Limited.
Producing vulcanized rubber articles by heating rubber composition containing sulfur, an organic accelerator, and a small amount of N,N-dimethyl N'-heptyl-p-phenylene diamine. No. 388,668. Dominion Rubber Company Limited.
Preserving rubber by incorporated therewith a carbamyl-amino diarylamine having the carbamyl group directly attached to the primary amino nitrogen atom of the amino diarylamine. No. 388,668. Dominion Rubber Company Limited.
Preserving rubber by incorporating therewith a carboxy-alkyl-amino-aryl arylamine. No. 388,669. Dominion Rubber Company Limited.
Preserving rubber by incorporating therewith an N-carbalkoxy-para-amino-diarylamine. No. 388,670. Dominion Rubber Company Limited.
Bleaching cellulosic materials by treating them with a hypochlorite solution to which has been added a compound normally insoluble in water but capable of being dissolved by dilute weak acids to form a neutral solution, following by souring and washing the material and treating it with an alkaline solution and an oxidizing bleaching agent. No. 388,676. Imperial Chemical Industries Limited.

Stabilizing a crude carbohydrate derivative which comprises introducing a crude saturated carbohydrate ether in a solid form into anhydrous liquid ammonia and subsequently separating said ammonia from said ether. No. 388,688. North American Rayon Corporation.

Purifying and stabilizing crude cellulose triacetate by introducing solid cellulose triacetate containing cellulose diacetate and an acid catalyst into anhydrous liquid ammonia to remove said diacetate by dissolution and said catalyst by neutralization from said triacetate and subsequently separating said ammonia from said cellulose triacetate. No. 388,689. North American Rayon Corporation.

Stabilizing a saturated cellulose ester by introducing a crude, saturated cellulose ester into anhydrous liquid ammonia and subsequently separating said ammonia from said ester. No. 388,690. North American Rayon Corporation.

Method and apparatus for making abrasive metal carbides. Nos. 388,691 and 388,692. Norton Company.

Writing paper having a highly calendered but non-glare surface, formed from paper stock consisting of 20% soda pulp, 60% bleached sulfite and 20% unbleached sulfite, plus ¾ ounce American blue Index No. 1288 and 6¾ ounces Paper Yellow C. H. Index No. 365. to every 1700 pounds of said stock. No. 388,698. The Reynolds Manufacturing Company.

Concentrating oxide ore minerals by froth flotation by introducing substantially completely pre-saponified acid-refined talloel in an aqueous ore mineral pulp and agitating and aërating the pulp in the presence of said saponified talloel. No. 388,705. Separation Process Company.

Process of obtaining acetic anhydride by passing oxygen into acetaldehyde in presence of an oxidation catalyst and a diluent. No. 388,706. Shawinigan Chemicals Ltd.

Preparation af acetone by passing a mixture of water vapor and acetylene under normal pressure at a temperature between 40 and 500° C. over a catalyst of one part ferric hydroxide prepared by precipitation from an iron salt by ammonia, and three to six parts of zinc oxide prepared by thermal decomposition of zinc carbonate. No. 388,707. Shawinigan Chemicals Limited.

Process for concentrating aqueous alkene solution. No. 388,708. Shell Development Co.

Local saponification of threads, ribbons, etc., having a basis of organic ester of cellulose by subjecting the material to the action on an alkaline saponification medium while locally reserved against alkaline saponification by means of a reserve composition containing a water soluble substance which reacts with the saponifying treatment to form a water soluble substance. No. 388,740. Henry Dreyfus.

Manufacture of stiff woven fabrics such as organdie by subjecting woven fabrics containing cellulose acetate yarns to the action of an aqueous solution of a water soluble alcohol for a period of the order of 5 seconds, and then treating the fabric with warm water so as to remove the alcohol. No. 388,741. Henry Dreyfus.

Hydrocarbon production by hydrogenation of distillable carbonaceous material by applying a catalyst comprising a polysulfide of a group V or VI metal which has been prepared by precipitation from aqueous composition selected from class consisting of solutions and suspensions of a thio compound of said metal. No. 388,742. N. V. Internationale Hydrogeneeringsoctrooien Mij.

Shatter-proof glass including a sheet of polyvinyl resin between each two adjacent glass sheets, said resin sheet including a resin produced from a polyvinyl ester having viscosity above 10 centipoise and which has been hydrolized to an extent of at least 70% and condensed with an aldehyde until the acetal reaction has proceeded to at least 80% of completion. No. 388,743. Shawinigan Chemicals Limited.

ENGLISH COMPLETE SPECIFICATIONS

Accepted and Published April 10, 1940.

Manufacture of monoazo dyes. No. 519,514. I. G. Farbenindustrie A. G.

Purification of aqueous alkali metal hydroxides. No. 519,415. Pittsburgh Plate Glass Co.

Concentration of aqueous alkali metal hydroxides. Nos. 519,416 and 519,616. Pittsburgh Plate Glass Co.

Manufacture of soap and apparatus therefor. Nos. 519,516 and 519,565. Refining, Inc.

Method of preparing a carotin-decolorizing agent and utilizing the same in making baked goods. No. 519,518. Standard Brands, Inc.

Process for the manufacture of sulfur trioxide. No. 519,570. Société des produits Azotés.

Manufacture of stable diazo salts. No. 519,574. E. I. du Pont de Nemours & Co.

Method and means for cleaning bacteriological filters. No. 519,520. J. D. Griffin.

Bleaching of cellulosic material. No. 519,522. Mathieson Alkali Works (Inc.).

Catalytic apparatus particularly for the conversion of hydrocarbons. No. 519,371. Socony-Vacuum Oil Co., Inc.

Manufacture of halogenated derivatives of ethylene polymers. No. 519,422. Imperial Chemical Industries Limited.

Aluminum alloys and articles made therefrom. No. 519,582. B. B. Pelly.

Production of polyvinyl resins. No. 519,378. Kodak Ltd.

Manufacture of maltosamines. No. 519,381. E. I. du Pont de Nemours & Co., Inc.

Manufacture of diazo dyestuffs. No. 519,432. I. G. Farbenindustrie A. G.

Manufacture of azo dyestuffs. No. 519,433. I. G. Farbenindustrie A. G.

Manufacture of indophenol-like compounds of the naphthocarbazole series. No. 519,434. I. G. Farbenindustrie A. G.

Method and apparatus for cleaning flue gases by washing. No. 519,436. A. A. R. Fastborg.

Process for the manufacture of dyestuff intermediates, and azo dyestuffs insoluble in water therefrom. No. 519,437. Imperial Chemical Industries Limited.

Process for the manufacture of light and porous materials from natural cellulose fibres and cement and mortar. No. 519,547. R. Handl and W. F. Wagner.

Permanent-magnet alloys. No. 519,597. Siemens & Halske A. G.

Manufacture of hydrogen peroxide. No. 519,467. G. Adolph and M. E. Bretschger.

Preparation of steroid-like derivatives and products obtained thereby. No. 519,468. Naamlooze Vennootschap Organon.

Soluble mineral oils suitable for use in metal working. No. 519,476. Standard Oil Development Company.

Concentration of gold-bearing ores. Nos. 519,472 and 519,473. P. W. Nevill.

Coating-pots for coating materials with molten metal and process therefor. No. 519,483. C. G. Fink.

Polyglycol derivatives and their use in treating textiles. No. 519,388. British Celanese, Ltd.

Removal of mercaptans from mercaptide solutions. No. 519,397. N. V. de Bataafsche Petroleum Mij.

Manufacture of substituted paraquinones and hydroquinones with particular reference to the improved manufacture of psi-cumoquinone and psi-cumohydroquinone. No. 519,398. British Drug Houses, Ltd.

Manufacture of saturated and unsaturated compounds of the bis-nor-cholanic acid and aetio-cholanic acid series and substitution products thereof. No. 519,507. Society of Chemical Industry in Basle.

Manufacture and production of liquid hydrocarbons. No. 519,613. I. G. Farbenindustrie A. G.

Manufacture of adhesive bitumins. No. 519,463. Standard Oil Development Co.

Accepted and Published April 17, 1940.

Manufacture of mercapto-benzthiazole derivatives. No. 519,617. Imperial Chemical Industries Limited.

Production of sized or waxed paper and paper products, fibres, textiles, and articles composed of the same. No. 519,618. T. W. Dickeson.

Emulsifying-agents, emulsion, and emulsified products, and processes for producing the same. No. 519,769. A. King.

Processes for increasing the sedimentation volume of insoluble solid materials or dispersed liquids and preventing the gravity separation of the same. No. 519,619. A. King.

Manufacture of cement. No. 519,770. Ritter Products Corporation.

Method of making synthetic powdered Japanese soy. No. 519,771. S. Machida.

De-alkylation of alkyl substituted phenols. No. 519,721. Bakelite, Ltd.

Improving the products of the synthesis of hydrocarbon oils from carbon monoxide and hydrogen. No. 519,722. Synthetic Oils, Ltd.

Manufacture of derivatives of fluoranthene. No. 519,776. Society of Chemical Industry in Basle.

Manufacture of nitrogenous condensation products of fluoranthene. No. 519,777. Society of Chemical Industry in Basle.

Manufacture of melamine. No. 519,683. Society of Chemical Industry in Basle.

Coating metal surfaces. No. 519,823. Pyrene Co., Ltd.

Process for the manufacture of substantive green polyazo dyestuffs. No. 519,644. I. G. Farbenindustrie A. G.

Manufacture of heterocyclic compounds of the diazaline series. No. 519,660. Sir G. T. Morgan and J. Stewart.

Manufacture of synthetic rubber-like materials. No. 519,730. I. G. Farbenindustrie A. G.

Manufacture of polymeric products of rubber-like character. No. 519,731. I. G. Farbenindustrie A. G.

Treatment of textile materials with artificial resins. No. 519,734. H. Schubert, H. A. Schubert, B. Schubert and E. Schubert.

Process of making antiseptic. No. 519,838. Ostro Research Laboratories, Inc.

Preparation of alkali salts of sulfuric esters of long chain aliphatic alcohols in needle form. No. 519,750. E. I. du Pont de Nemours & Co., Inc.

Production of titanium dioxide pigments. No. 519,785. E. I. du Pont de Nemours & Co., Inc.

Production of impermeable material and composition for use therein. No. 519,754. W. J. H. Hinrichs.

Sulfonamide compounds and methods of making them. No. 519,661. F. Meyer.

Manufacture of artificial films, threads, or sheets from plastic materials. No. 519,788. I. G. Farbenindustrie A. G.

Fire-extinguishing apparatus employing liquid carbon dioxide as a fire-extinguishing medium. No. 519,789. Cardox (Great Britain), Ltd.

Preparation of wetting and frothing agents. No. 519,710. F. Pollak.

Liquating zinc from zinc dust and similar products containing metallic zinc. No. 519,792. Stolberger Zink A. G. fur Bergbau und Hutten-Betriebs *and* Metallgesellschaft A. G.

Treatment of waste sulfite liquor. No. 519,848. Norsk Hydro-Elektrisk Kvaelstofaktieselskab.

Process and apparatus for producing metals. No. 519,850. M. F. C. Co.

Synthetic contact masses and their preparation. No. 519,808. Houdry Process Corp.

Removal of hydrogen sulfide from waste gases. No. 519,856. Courtaulds, Ltd.

Fused salt electrolytic cells and anodes therefor. No. 519,814. E. I. du Pont de Nemours & Co., Inc.

Process for the treatment of lac or shellac. No. 519,865. A. F. Suter, A. Janser and W. E. Suter.

Method and apparatus for providing a metal base part with a coating of a metal by means of a blow-pipe. No. 519,762. H. Klopstock and P. F. Peddinghaus.

Accepted and Published April 24, 1940.

Method of adding lead to steel. Nos. 520,024 and 520,072. Inland Steel Co.

Manufacture of base-exchange materials. No. 519,872. Aktieselskabet Faero-Kul.

Refractory alloy composition. No. 520,025. C. A. Lind.

Manufacture of catalysts. No. 519,874. Distillers Co., Ltd.

Production of sensitizing agents for use in the determination of pregnancy. No. 520,077. Lakeland Foundation.

Manufacture of oil and cake from meal. Nos. 519,876 and 519,923. A. W. Sizer.

Carbon dioxide fire-extinguisher. No. 519,881. Cardox (Great Britain), Ltd.

Method of producing pure kapok yarn from kapok fibre. No. 519,943. J. D. Swoyer.

Manufacture of dinitriles of dicarboxylic acids. No. 519,888. Society of Chemical Industry in Basle.

Manufacture of amine and its salts. No. 519,894. Imperial Chemical Industry Ltd.

Sensitizing of photographic amulsions. No. 519,895. J. D. Kendall.

Polymerization of vinyl esters. No. 519,900. Carbide and Carbon Chemicals Corp.

Copper-aluminum alloy. No. 519,902. H. C. Hall and H. E. Gresham.

Method for the continuous treatment of enriched benzol wash-oil. No. 519,903. H. Koppers' Industrielle Mij N. V.

Production of cellulose ethers. No. 519,907. E. I. du Pont de Nemours & Co., Inc.

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Foreign Chemical Patents

Belgian, Canadian, English and French—p. 22

Treatment of artificial filaments, yarns, and other materials made of cellulose derivatives. No. 519,950. Henry Dreyfus.
Plasticizing of rubber. No. 519,998. E. I. du Pont de Nemours & Co., Inc.
Manufacture of natural rubber and artificial rubber-like masses. No. 520,097. I. G. Farbenindustrie A. G.
Process for the manufacture of a chemical absorbent for carbon dioxide. No. 519,959. Auerges. A. G.
Manufacture of acid-monoazo dyestuffs. No. 520,101. J. R. Geigy A. G.
Hydrogenation of unsaturated hydrocarbons. No. 520,115. Universal Oil Products Co.
Manufacture and application of synthetic rubber-like materials. No. 520,022. Imperial Chemical Industries Limited.

Accepted and Published May 1, 1940.

Manufacture of iron and steel. No. 520,277. Brassert & Co., Ltd.
Purification of gases. No. 520,327. I. G. Farbenindustrie A. G.
Method and means of adding lead to steel. No. 520,227. Inland Steel Co.
Production of lactic-acid preparations. No. 520,281. W. Bickel.
Steel alloy. No. 520,282. Ruhrstahl A. G.
Manufacture of amino-alcohol esters. No. 520,179. E. R. Squibb & Sons.
Catalytic cracking of hydrocarbon oil. No. 520,229. Standard Oil Development Co.
Materials for use in the production of alloys containing chromium. No. 520,331. M. J. Udy.
Method and apparatus for descaling metal strip. No. 520,129. Wean Engineering Co., Inc.
Purification of oils. No. 520,233. J. Bibby and Sons, Ltd. *et al.*
Detergents. No. 520,140. Aktiebolaget Purnol.
Manufacture of cement. No. 520,149. Godfrey L. Cabot, Inc.
Manufacture of artificial threads filaments, and formations of cellulose ethers and esters. No. 520,152. F. D. Lewis.
Treatment or production of gasoline hydrocarbons. No. 520,159. Texaco Development Corp.
Working-up of cellulose derivatives. No. 520,162. Deutsche Hydrierwerke A. G.
Alcoholysis of polymerizable esters. No. 520,164. Röhm & Haas A. G.
Manufacture of beryllium compounds from beryllium earths. No. 520,167. Ges. zur Verwertung-Chemisch Technischer Verfahren A. G. *and* Opatowski, R. S.
Activation of silver catalysts. No. 520,170. Carbide and Carbon Chemicals Corp.
Refining of vegetable and animal oils or fats. No. 520,285. Aktiebolaget Separator.
Extraction of phenols from aqueous solution. No. 520,198. I. G. Farbenindustrie A. G.
Process for the manufacture of phthalocyanine sulfoamides. No. 520,199. I. G. Farbenindustrie A. G.
Method of hydrogenating ketones and aldehydes. Nos. 520,201 and 520,241. J. Blumenfeld.
Glass composition for the production of glass fibre. No. 520,247. N. V. Mij. tot Beheer en Exploitatie van Octrooien.
Manufacture of cellulose derivatives. No. 520,336. Henry Dreyfus.
Separation of polymerizable organic compounds. No. 520,255. E. I. du Pont de Nemours & Co., Inc.
Aluminum alloys. No. 520,288. H. Mahle.
Manufacture of artificial plastic material. No. 520,342. Henry Dreyfus.
Reclaiming rubber. No. 520,358. V. Merz.
Food product for treatment of infantile diarrhoea. No. 520,294. C. A. Tompkins.
Anti-knocking hydrocarbon fuels. No. 520,257. Usines de Melle.
Manufacture of polyamides. No. 520,263. E. I. du Pont de Nemours & Co., Inc.
Plodding of plastic-milled soap. No. 520,269. Procter & Gamble Co.
Photographic diazotype processes. No. 520,304. Mason & Sons, Ltd.
Manufacture of 1-cyanobutadiene-1:3. No. 520,272. Imperial Chemical Industries Ltd.
Method of enlarging the active surface of aluminum electrodes for electrolytic condensers. No. 520,372. Philips Lamps, Ltd.
Manufacture of derivatives of phenanthridine. No. 520,273. Sir G. T. Morgan and L. P. Walls.
Cracking or coking hydrocarbon oils. No. 520,276. N. V. Nieuwe Octrooi Mij.

FRENCH PATENTS

Granted November 18, 1939; Published November 30, 1939.

Process for increasing the temperature of crystallization of metals and alloys. No. 853,043. Fides Ges. fur die Versaltung und Verwertung von Gewerblichen Schutzrechten m. b. H.
Improvements in processes and apparatus for obtaining iron or ferromagnetic metals in powder form. Association des Ouvriers en Instruments de Précision.
Improvements in preparing high melting point alloys, and particularly those of osmium. No. 853,135. Goldsmith Bros. Smelting & Refining Co.
Process for preventing corrosion of aluminum and aluminum alloys by acid solution of oxygenated water. No. 853,074. E. I. du Pont de Nemours & Co., Inc.
Process for the manufacture of ascorbic acid. No. 852,981. Les Ets. Byla.
Process for the preparation of carboxylic acids. No. 853,040. E. I. du Pont de Nemours & Co., Inc.
Process for the manufacture of hydroxy-aldehydes and hydroxy-ketones. No. 853,101. Imperial Chemical Industries Limited.
Process for producing aliphatic oxy compounds. No. 853,148. I. G. Farbenindustrie A. G.
Recovery of amino acids from solutions containing them. No. 853,173. Corn Products Refining Company.
Process for the production of sulfur. No. 853,186. I. G. Farbenindustrie A. G.
Process for the manufacture of hydrogen. Nos. 853,200 and 853,201. The M. W. Kellogg Company.
Process for the production of zinc oxide. No. 852,972. R. Aumas and C. Leroy.
Process for preventing settling of the disperse phase in paints. No. 853,032. Byk-Guldenwerke Chemische Fabrik A. G.
Monoazo dyes and process for their manufacture. No. 853,177. I. G. Farbenindustrie A. G.
Method of dyeing with sulfur dyes. No. 853,197. Société pour l'Industrie Chimique a Bale.
Explosive. No. 853,090. Molex Explosives Ltd.
Process and apparatus for the extraction of liquids, such as benzine and other hydrocarbons, contained in gels and analogous products. No. 853,016. A. G. A. Bartoli.
Process for the manufacture of an oil similar to petroleum by dry distillation of carbonaceous matter. No. 853,029. Zaidan Hojin Rihagaku Kenkyujo.
Improved Diesel fuel and process for its preparation. No. 853,052. Standard Oil Development Company.
Process and apparatus for the catalytic conversion of hydrocarbons. No. 853,133. The M. W. Kellogg Co.
Process for the preparation of anti-knock motor fuels. No. 853,168. N. V. de Bataafsche Petroleum Mij.
Process for the manufacture of synthetic resins. No. 853,051. Standard Oil Development Company.
Process for fractionating fatty acids. No. 853,065. H. P. Kauffman.
Separation of entrained substances from fatty acids. No. 853,066. H. P. Kauffman.
Process for the manufacture of glue for paper. No. 853,050. Dr. Bruno Wieger O. H. G.
Manufacture of valuable proteid substances, such as glue and gelatine, from hides, etc. No. 853,114. E. Elod and T. Schachowskoy.
Tanning process using formaldehyde. No. 853,123. A. Ferretti.
Improvements in nitration of wood pulp. No. 853,004. J. Portier.
Manufacture of wood-base insulation. No. 853,061. Ateliers de Constructions Electriques de Charleroi.
Solvent, emolient and gelatinizing agents. No. 853,106. Deutsche Hydrierwerke A. G.

Granted November 28, 1939; Published December 7, 1939.

Process for separation of nickel from copper. No. 853,299. I. G. Farbenindustrie A. G.
Process for removing fluorine from roasting gases. No. 653,303. Metallgesellschaft A. G.
Deposition of metal films with the aid of vaporized metal. No. 853,210. P. Alexander.
Method of manufacturing ceramic products resistant to thermal shock. No. 853,331. Robert Bosch G. m. b. H.
Preparation of complex ethers having aromatic radicals. No. 853,300. I. G. Farbenindustrie A. G.
Preparation of carboxylic acids of the cyclopentanopolyhydrophenanthrene series. No. 853,309. Schering A. G.
Production of sulfonated ketones. No. 853,353. I. G. Farbenindustrie A. G.
Improvements in the preparation of paste pigments for the manufacture of synthetic cellulose enamels and paints. No. 853,209. V. Cavalie, M. Gandoz and S. Johnson.
Process for aromatizing hydrocarbons. No. 853,267. The M. W. Kellogg Co.
Improvements in the manufacture, and particularly the alkylation, of hydrocarbons. No. 853,271. Texaco Development Corporation.
Manufacture of hydrocarbons by hydrogenation of carbon monoxide. No. 853,302. N. V. Internationale Koolwaterstoffen Synthese Mij.
Improvements in distillation of crude oils from schist, etc. No. 853,313. R. Adler.
Process of extracting rosin from pine wood. No. 853,281. I. G. Farbenindustrie A. G.

Granted December 1, 1939; Published December 7, 1939.*

* Additions to previously issued patents. The second number is that of the original.
Process for the manufacture of aluminum. No. 50,314/848,375. I. J. Foundaminsky and H. Loevenstein.
Process for the manufacture of low-phosphorus Thomas steel. No. 50,347/846,061. S. A. des Forges et Acieries du Nord et de l'Est.
Process for the decomposition of phosphates. No. 50.324/838,187. I. G. Farbenindustrie A. G.
Preparation of dyestuffs of the triarylmethane series. No. 50.335/-824,094. I. G. Farbenindustrie A. G.
Manufacture of phosphorescent lithopone. No. 50,307/834,365. W. N. Hirschel.
Process for the manufacture of resinous condensation products. No. 50,329/818,931. Bakelite G. m. b. H.